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For related information see also *Astronautics*.

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For related information see also *34 Fluid Mechanics and Heat Transfer*

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84 LAW AND POLITICAL SCIENCE **3725**
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **3725**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **N.A.**

89 ASTRONOMY **3726**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **3727**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **3728**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **3728**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **3729**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

GENERAL

99 GENERAL **3730**

Note: N.A. means that no abstracts were assigned to this category for this issue.

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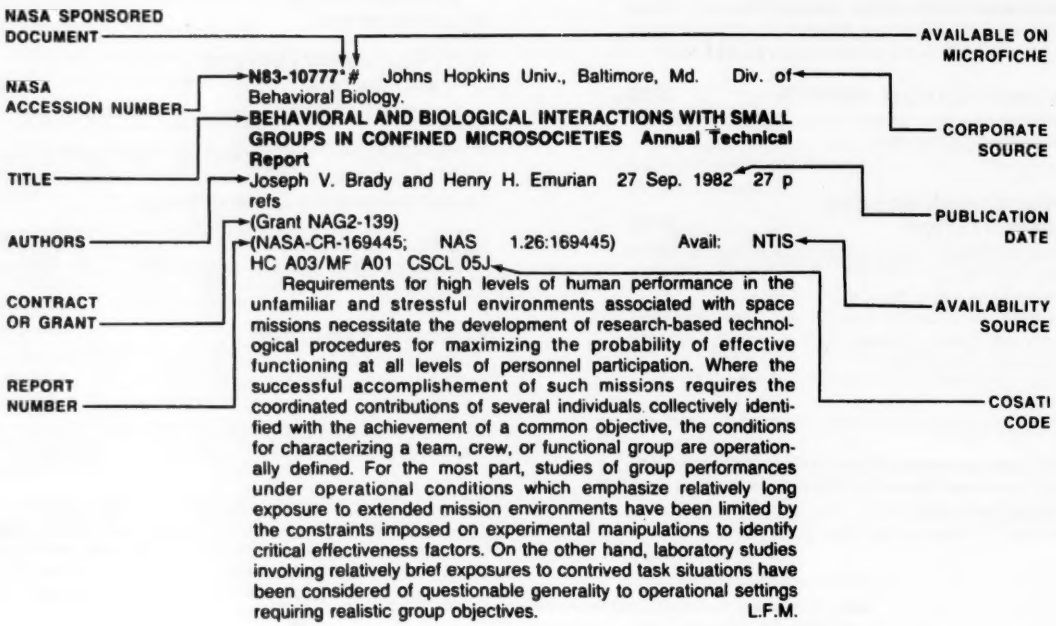
TYPICAL CITATION AND ABSTRACT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N83-10777* # Johns Hopkins Univ., Baltimore, Md. Div. of Behavioral Biology.
CORPORATE SOURCE
TITLE
BEHAVIORAL AND BIOLOGICAL INTERACTIONS WITH SMALL GROUPS IN CONFINED MICROSOCIETIES Annual Technical Report
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Joseph V. Brady and Henry H. Emurian 27 Sep. 1982 27 p refs
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(NASA-CR-169445; NAS 1.26:169445) Avail: NTIS HC A03/MF A01 CSCL 05J
COSATI CODE
Requirements for high levels of human performance in the unfamiliar and stressful environments associated with space missions necessitate the development of research-based technological procedures for maximizing the probability of effective functioning at all levels of personnel participation. Where the successful accomplishement of such missions requires the coordinated contributions of several individuals collectively identified with the achievement of a common objective, the conditions for characterizing a team, crew, or functional group are operationally defined. For the most part, studies of group performances under operational conditions which emphasize relatively long exposure to extended mission environments have been limited by the constraints imposed on experimental manipulations to identify critical effectiveness factors. On the other hand, laboratory studies involving relatively brief exposures to contrived task situations have been considered of questionable generality to operational settings requiring realistic group objectives. L.F.M.

VOLUME 21 NUMBER 22/NOVEMBER 23, 1983

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N83-33827*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PROCEEDINGS: SIXTH ANNUAL WORKSHOP ON METEOROLOGICAL AND ENVIRONMENTAL INPUTS TO AVIATION SYSTEMS
Walter Frost, ed., Dennis W. Camp, ed., and Linda W. Hershman, ed. Apr. 1983 140 p refs Workshop held in Tullahoma, Tenn., 26-28 Oct. 1982; sponsored in cooperation with NOAA and FAA Prepared in cooperation with Tennessee Univ. Space Inst., Tullahoma Original contains color illustrations
(Contract NAS8-34627)
(NASA-CP-2274; NAS 1.55:2274; FAA-RD-82-72) Avail: NTIS HC A07/MF A01 CSCL 01A

The topics of interaction of the atmosphere with aviation systems, the better definition and implementation of services to operators, and the collection and interpretation of data for establishing operational criteria relating the total meteorological inputs from the atmospheric sciences to the needs of aviation communities were addressed. For individual titles, see N83-33828 through N83-33840.

N83-33828*# National Weather Service, Washington, D.C.
AVIATION WEATHER SERVICES **c47**
Charles H. Sprinkle *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 14-16 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

The primary responsibilities of the National Weather Service (NWS) are to: provide warnings of severe weather and flooding for the protection of life and property; provide public forecasts for land and adjacent ocean areas for planning and operation; and provide weather support for: production of food and fiber; management of water resources; production, distribution and use of energy; and efficient and safe air operations. Author

N83-33829*# National Aeronautics and Space Administration, Washington, D. C.
NASA'S AVIATION SAFETY - METEOROLOGY RESEARCH PROGRAMS **c03**
Roger L. Winblade *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 17-18 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 01C

The areas covering the meteorological hazards program are: severe storms and the hazards to flight generated by severe storms; clear air turbulence; icing; warm fog dissipation; and landing systems. Remote sensing of ozone by satellites, and the use of satellites as data relays is also discussed. Author

N83-33830*# Department of Defense, Washington, D. C. Office of Environmental and Life Sciences.
DEPARTMENT OF DEFENSE METEOROLOGICAL AND ENVIRONMENTAL INPUTS TO AVIATION SYSTEMS **c47**
Paul D. Try *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 19-20 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

Recommendations based on need, cost, and achievement of flight safety are offered, and the re-evaluation of weather parameters needed for safe landing operations that lead to reliable and consistent automated observation capabilities are considered. Author

N83-33831*# Federal Aviation Administration, Washington, D.C. Office of Associate Administrator for Development and Logistics.
FEDERAL AVIATION ADMINISTRATION WEATHER PROGRAM TO IMPROVE AVIATION SAFETY **c47**
Robert W. Wedan *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 21-25 refs (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

The implementation of the National Airspace System (NAS) will improve safety services to aviation. These services include collision avoidance, improved landing systems and better weather data acquisition and dissemination. The program to improve the quality of weather information includes the following: Radar Remote Weather Display System; Flight Service Automation System; Automatic Weather Observation System; Center Weather Processor, and Next Generation Weather Radar Development. B.G.

N83-33832*# National Aeronautics and Space Administration, Washington, D. C.
APPLICATIONS OF THE SPACE PERSPECTIVE TO AVIATION **c47**
John S. Theon *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 34-36 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

A brief history of weather forecasting was presented starting in the seventeen hundreds with George Hadley to modern day satellite applications. B.G.

N83-33833*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A CURSORY GLANCE AT RESULTS FROM NASA'S B-57B GUST GRADIENT PROGRAM **c47**
Warren Campbell *In its* Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 38-42 Original contains color illustrations (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

The Gust Gradient Program is a data intensive effort involving

tripple Doppler radar, a surface weather station mesonet and other aircraft. The Joint Airport Weather Studies was utilized to gain additional data. The data were used to fill in the gap in turbulence modeling. B.G.

N83-33834*# National Weather Service, Silver Spring, Md.
GEM: STATISTICAL WEATHER FORECASTING PROCEDURE **c47**

Robert G. Miller *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 42-44 ref (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

The objective of the Generalized Exponential Markov (GEM) Program was to develop a weather forecast guidance system that would: predict between 0 to 6 hours all elements in the airways observations; respond instantly to the latest observed conditions of the surface weather; process these observations at local sites on minicomputing equipment; exceed the accuracy of current persistence predictions at the shortest prediction of one hour and beyond; exceed the accuracy of current forecast model output statistics inside eight hours; and be capable of making predictions at one location for all locations where weather information is available. Author

N83-33835*# Transportation Systems Center, Cambridge, Mass.
CURRENT STATUS OF VISIBILITY SENSORS FOR AVIATION **c06**

David C. Burnham *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 47-56 Original contains color illustrations (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 01D

The development of a new increased range higher visibility was investigated. The visibility sensor that is currently is the Transmissometer. Current transmissometer technology provides only a factor of 10 dynamic range with a single base line. The FAA is preparing to install automated weather observing systems (AWOS) at many locations. These systems require visibilities up to approximately 5 miles. To use a transmissometer for this type of measurement, the base line must be about 1,000 feet; where alignment becomes very difficult to maintain. New technologies were developd for measuring visibility. Improved transmissometers, forward-scatter meters and back-scatter meters have become available. A current practical issue for visibility sensors is how to specify one that is good enough to meet the needs of aviation. The first question is what performance is required; how accurately must the sensor measure? Visibility sensors do not actually measure the visibility directly. The purpose of measuring the visibility is to predict what the pilot will see a considerable distance away from the sensor location. The atmosphere introduces considerable variation in the measurement and the basic sensor accuracy needed is difficult to define. The second question for high visibilities is what to use as the standard reference sensor. The third question pertains to the competitive procurement of visibility sensors, which is mandated at present. Two acceptance test procedures to be used to insure satisfactory sensor performance is examined. E.A.K.

N83-33836# Federal Aviation Administration, Washington, D.C. Office of Environment and Energy.
EXISTING WIND OBSERVATION NETWORK **c47**

David E. Winer *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 56-60 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

A real time wind observations of which the purpose is fuel efficient flight planning and air traffic control is discussed. The possibilities of travelling several ways, including a great circle route, a more or less straightline route and following wind circulation patterns was investigated. It is found that the longest route actually uses the least fuel, some 14% less than the great circle route. It is suggested that improving the observation system has an enormous potential and probably could easily pay for itself in a year. The profiler instrumentation is developed. Some broad characteristics of the instrumentation and of the program are shown. The instrumentation can function in clear air as well as cloudy air. E.A.K.

N83-33837*# Finnish Meteorological Inst., Helsinki. Aviation Weather Service.
MARKED SURFACE INVERSIONS AND WIND SHEAR: A SAFETY RISK FOR DEPARTING AIRCRAFT **c47**

Ossi Korhonen *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 61-62 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

Marked surface inversions occur most frequently in dry continental climates, where low atmospheric humidity allows heat transfer by long wave thermal radiation. In the northern latitudes, surface inversions reach their maximum intensity during the winter, when the incoming Sun's radiation is negligible and radiative cooling is dominant during the long nights. During winter, air mass boundaries are sharp, which causes formation of marked surface inversions. The existence of these inversions and sharp boundaries increase the risk of wind shear. The information should refer to marked inversions exceeding a temperature difference of 10 deg C up to 1000 feet. The need to determine the temperature range over which he information is operationally needed and the magnitude of the inversion required before a notification to pilots prior to departure is warranted are outlined. E.A.K.

N83-33838*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LIGHTNING STRIKE EXPERIENCE IN THE NASA F-106B STORM HAZARDS PROGRAM **c47**

Norman L. Crabill *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 63-65 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

A heavily instrumented F-106B aircraft was flown in thunderstorms to gather data for characterizing lightning at aircraft operating altitudes. Conventional weather finding techniques are supplemented with UHF lightning mapping radar to select the most active storm cells and the most likely altitude for obtaining direct lightning strikes to the airplane. One hundred seventy-six strikes were obtained in a 3 year period, mostly at an altitude of above 25,000 feet. E.A.K.

N83-33839*# Royal Aircraft Establishment, Bedford (England).
WIND SHEAR AND VORTEX WAKE RESEARCH IN UK, 1982 **c47**

Alan A. Woodfield *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 66-83 refs (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

A wind shear and vortex wake and their impact on aircraft were investigated. The systems and advice to help pilots, and rational scientific methods to assist in advising certification authorities and those interested in improving flight safety were developed. Wind Shear and Vortex Wakes are related, they are both invisible enemies of aircraft in the form of large disturbances in the atmosphere, both cause major accidents. Problems of building wakes at airports are is considered. Research on wind shear was initiated by the American FAA following the Boston, New York and Denver accidents to civil airliners. This resulted in: useful advice to pilots about wind shear; better attempts by the meteorologists at forecasting wind shear conditions; and useful ideas for wind shear measurement and warning systems. Three major research tasks are outstanding: (1) Worldwide measurements to give reliable estimates of probability and details of the forms of large wind shears; (2) Developments of real time wind shear

measuring systems for ground or airborne use; and (3) Establishing relationships between measured wind shear and the potential hazard to an aircraft, or class of aircraft. E.A.K.

N83-33840*# National Center for Atmospheric Research, Boulder, Colo.
JOINT AIRPORT WEATHER STUDIES (AWS) PROJECT c47
John McCarthy *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 85-95 Original contains color illustrations (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

The joint airport weather studies (JAWS) project is discussed. The major objectives of the JAWS Project are a fundamental description of the phenomenon, a determination of the hazard potential and a definition of a protection and warning system, all of which are relative to low level wind shear. Aspects of the low level wind shear phenomenon. The principal focus, however, is the microburst. The microburst is fundamentally a rather simple atmospheric flow. It is a downdraft that, upon approaching the surface, spreads out horizontally, poducing a diverging radial flow in all directions. For any direction that an aircraft flies through the microburst, it will first encounter increasing head winds; then the remnants of the downdraft; and then, increasing tail wind. E.A.K.

N83-33841# Naval Postgraduate School, Monterey, Calif.
THE IMPACT OF RELIABILITY IMPROVEMENT WARRANTIES ON NAVAL AVIATION MAINTENANCE AT THE FLEET LEVEL M.S. Thesis
Donald J. Shutt and James H. Martin Dec. 1982 71 p refs
(AD-A126810) Avail: NTIS HC A04/MF A01 CSCL 05/1

The use of reliability improvement warranties (RIW) to improve weapon system reliability and maintainability were studied. Past and present contracts to assess RIW impacts on the Naval Aviation community from an operational and supply point are reviewed. The complexities of fleet level management of warranted assets, the risks posed to the contracting parties, the opinions of fleet maintenance managers, and the RIW's expected fiscal benefits, are discussed. GRA

N83-33842# Air Force Systems Command Liason Office, Ottawa (Ontario).
GUIDE TO CANADIAN AEROSPACE RELATED INDUSTRIES
Robert L. McKenney, Jr. and Donald J. Pearson Jan. 1983 300 p
(AD-A126540; AFSC-TR-83-001) Avail: NTIS HC A13/MF A01 CSCL 05/3

A guide which is a contracting source list of Canadian aerospace related industries to be used by USAP procurement offices, project engineers, and scientists is presented. It provides company profiles, a company keyword index, and contact points for each company. GRA

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N83-33843*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
LINEARIZED POTENTIAL SOLUTION FOR AN AIRFOIL IN NONUNIFORM PARALLEL STREAMS Progress Report, 1 Jan. - 31 May 1983
R. K. Prabhu and S. N. Tiwari Aug. 1983 43 p refs
(Contract NCC1-65)
(NASA-CR-173047; NAS 1.26:173047) Avail: NTIS HC A03/MF A01 CSCL 01A

A small perturbation potential flow theory is applied to the problem of determining the chordwise pressure distribution, lift and pitching moment of a thin airfoil in the middle of five parallel streams. This theory is then extended to the case of an undisturbed stream having a given smooth velocity profile. Two typical examples are considered and the results obtained are compared with available solutions of Euler's equations. The agreement between these two results is not quite satisfactory. Possible reasons for the differences are indicated. Author

N83-33844*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN EVALUATION AND ASSESSMENT OF FLOW QUALITY IN SELECTED NASA WIND TUNNELS
W. D. Harvey, P. C. Stainback, and F. K. Owen (Complere, Inc.) Aug. 1983 46 p refs
(NASA-TM-85659; NAS 1.15:85659) Avail: NTIS HC A03/MF A01 CSCL 01A

Tests have been conducted in a number of NASA wind tunnels to measure disturbance levels and spectra in their respective settling chambers, test sections, and diffusers to determine the sources of their disturbances. The present data supplements previous results in other NASA tunnels and adds to the ongoing acquisition of a disturbance level data base. The present results also serve to explain flow related sources which cause relatively large disturbance amplitudes at discrete frequencies. The installation of honeycomb, screens, and acoustic baffles in or upstream of the settling chamber can significantly reduce the disturbance levels. Author

N83-33845*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AN EXPERIMENTAL STUDY OF TRANSONIC FLOW ABOUT A SUPERCRITICAL AIRFOIL
Frank W. Spaid (McDonnell Douglas Research Labs., St. Louis), John A. Dahlin (Douglas Aircraft Co., Long Beach, Calif.), William D. Bachalo (Aerometrics, Inc.), and Louis S. Stivers, Jr. Aug. 1983 102 p refs
(NASA-TM-81336; A-8762; NAS 1.15:81336) Avail: NTIS HC A06/MF A01 CSCL 01A

A series of experiments was conducted on flow fields about two airfoil models whose sections are slight modifications of the original Whitcomb supercritical airfoil section. Data obtained include surface static-pressure distributions, far-wake surveys, oil-flow photographs, pitot-pressure surveys in the viscous regions, and holographic interferograms. These data were obtained for different combinations of lift coefficient and free-stream Mach number, which included both subcritical cases and flows with upper-surface shock waves. The availability of both pitot-pressure data and density data from interferograms allowed determination of flow-field properties in the vicinity of the trailing edge and in the wake without recourse to any assumptions about the local static pressure. The data show that significant static-pressure gradients normal to viscous layers exist in this region, and that they persist to approximately 10% chord downstream of the trailing edge. Comparisons are made between measured boundary-layer properties and results from boundary-layer computations that employed measured static-pressure distributions, as well as comparisons between data and results of airfoil flow-field computations. Author

N83-33846*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AN EXPERIMENTAL STUDY OF TRANSONIC FLOW ABOUT A SUPERCRITICAL AIRFOIL. STATIC PRESSURE AND DRAG DATA OBTAINED FROM TESTS OF A SUPERCRITICAL AIRFOIL AND AN NACA 0012 AIRFOIL AT TRANSONIC SPEEDS, SUPPLEMENT
Frank W. Spaid (McDonnell Douglas Research Labs., St. Louis), John A. Dahlin (Douglas Aircraft Co.. Long Beach, Calif.), Frederick W. Roos (McDonnell Douglas Research Labs., St. Louis), and Louis S. Stivers, Jr. Aug. 1983 225 p
(NASA-TM-81336-Suppl; A-8762; NAS 1.15:81336-Suppl) Avail: NTIS HC A10/MF A01 CSCL 01A

Surface static-pressure and drag data obtained from tests of two slightly modified versions of the original NASA Whitcomb airfoil

and a model of the NACA 0012 airfoil section are presented. Data for the supercritical airfoil were obtained for a free-stream Mach number range of 0.5 to 0.9, and a chord Reynolds number range of 2 x 10 to the 6th power to 4 x 10 to the 6th power. The NACA 0012 airfoil was tested at a constant chord Reynolds number of 2 x 10 to the 6th power and a free-stream Mach number range of 0.6 to 0.8. Author

N83-33847*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPECTRAL METHODS FOR INVISCID, COMPRESSIBLE FLOWS Final Report
M. Y. Hussaini, M. D. Salas, and T. A. Zang Jul. 1983 40 p refs
(Contracts NAS1-16394; NAS1-17130; Grant NAG1-109)
(NASA-CR-172710; NAS 1.26:172710; Rept-83-31) Avail: NTIS HC A03/MF A01 CSCL 01A

Report developments in the application of spectral methods to two dimensional compressible flows are reviewed. A brief introduction to spectral methods -- their history and especially their implementation -- is provided. The stress is on those techniques relevant to transonic flow computation. The spectral multigrid iterative methods are discussed with application to the transonic full potential equation. Discontinuous solutions of the Euler equations are considered. The key element is the shock fitting technique which is briefly explained. Author

N83-33848*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CONTRACTS, GRANTS AND FUNDING SUMMARY OF SUPERSONIC CRUISE RESEARCH AND VARIABLE-CYCLE ENGINE TECHNOLOGY PROGRAMS, 1972 - 1982
Sherwood Hoffman and Mary C. Varholic (NASA. Lewis Research Center) Sep. 1983 80 p refs
(NASA-TM-85650; L-15611; NAS 1.15:85650) Avail: NTIS HC A05/MF A01 CSCL 01A

NASA-SCAR (AST) program was initiated in 1972 at the direct request of the Executive Office of the White House and Congress following termination of the U.S. SST program. The purpose of SCR was to conduct a focused research and technology program on those technology programs which contributed to the SST termination and, also, to provide an expanded data base for future civil and military supersonic transport aircraft. Funding for the Supersonic Cruise Research (SCR) Program was initiated in fiscal year 1973 and terminated in fiscal year 1981. The program was implemented through contracts and grants with industry, universities, and by in-house investigations at the NASA/OAST centers. The studies included system studies and five disciplines: propulsion, stratospheric emissions impact, materials and structures, aerodynamic performance, and stability and control. The NASA/Lewis Variable-Cycle Engine (VCE) Component Program was initiated in 1976 to augment the SCR program in the area of propulsion. After about 2 years, the title was changed to VCE Technology program. The total number of contractors and grantees on record at the AST office in 1982 was 101 for SCR and 4 for VCE. This paper presents a compilation of all the contracts and grants as well as the funding summaries for both programs.
Author

N83-33849*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MODELING OF TURBULENT SEPARATED FLOWS FOR AERODYNAMIC APPLICATIONS
Joseph G. Marvin Aug. 1983 99 p refs
(NASA-TM-84392; A-9438; NAS 1.15:84392) Avail: NTIS HC A05/MF A01 CSCL 01A

Steady, high speed, compressible separated flows modeled through numerical simulations resulting from solutions of the mass-averaged Navier-Stokes equations are reviewed. Emphasis is placed on benchmark flows that represent simplified (but realistic) aerodynamic phenomena. These include impinging shock waves, compression corners, glancing shock waves, trailing edge regions, and supersonic high angle of attack flows. A critical assessment of modeling capabilities is provided by comparing the numerical simulations with experiment. The importance of combining experiment, numerical algorithm, grid, and turbulence model to effectively develop this potentially powerful simulation technique is stressed.
S.L.

N83-33850*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Inst. for Computer Applications in Science and Engineering.
SHOCK-FITTED EULER SOLUTIONS TO SHOCK-VORTEX INTERACTIONS
Manuel E. Salas, Thomas A. Zang (College of William and Mary), and M. Yousuff Hussaini 16 Aug. 1982 13 p refs
(Contracts NAS1-16394; NAS1-15810; Grant NAG1-109)
(NASA-TM-85411; NAS 1.15:85411; Rept-82-24) Avail: NTIS HC A02/MF A01 CSCL 01A

The interaction of a shock wave with a hot spot, a single vortex and a vortex street is studied within the framework of the two dimensional compressible Euler equations. The numerical results obtained by the pseudospectral method and the finite difference MacCormack method are compared. In both the methods the shock wave is fitted as a boundary of the computational domain. Author

N83-33851*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Inst. for Computer Applications in Science and Engineering.
SPECTRAL MULTIGRID METHODS WITH APPLICATIONS TO TRANSONIC POTENTIAL FLOW
Craig L. Streett, Thomas A. Zang (College of William and Mary), and M. Yousuff Hussaini 29 Apr. 1983 55 p refs
(Contracts NAS1-17130; NAS1-17070; Grant NAG1-109)
(NASA-TM-85412; NAS 1.15:85412; Rept-83-11) Avail: NTIS HC A04/MF A01 CSCL 01A

Spectral multigrid methods are demonstrated to be a competitive technique for solving the transonic potential flow equation. The spectral discretization, the relaxation scheme, and the multigrid techniques are described in detail. Significant departures from current approaches are first illustrated on several linear problems. The principal applications and examples, however, are for compressible potential flow. These examples include the relatively challenging case of supercritical flow over a lifting airfoil. Author

N83-33852*# Boeing Co., Seattle, Wash.
FLIGHT TEST EVALUATION OF DRAG EFFECTS ON SURFACE COATINGS ON THE NASA BOEING 737 TCV AIRPLANE
Dezso George-Falvy and Danny A. Sikavi Jun. 1981 100 p refs Revised
(Contract NAS1-15325)
(NASA-CR-165767; NAS 1.26:165767; D6-37256-Rev) Avail: NTIS HC A05/MF A01 CSCL 01A

A flight test program was conducted in which the effects of various surface coatings on aerodynamic drag were investigated; results of this program are described in this report. The tests were conducted at NASA-Langley Research Center on the terminal configured vehicle (TCV) Boeing 737 research airplane. The Boeing Company, as contractor with NASA under the Energy Efficient Transport (EET) program, planned and evaluated the experiment. The NASA-TCV Program Office coordinated the experiment and performed the flight tests. The principal objective of the test was to evaluate the drag reduction potential of an elastomeric polyurethane surface coating, CAAPCO B-274, which also has been considered for application on transport airplanes to protect leading edges from erosion. The smooth surface achievable with this type of coating held some promise of reducing the skin friction drag as compared to conventional production type aircraft surfaces, which are usually anodized bare metal or coated with corrosion protective paint. Requirements for high precision measurements were the principal considerations in the experiment. Author

N83-33853*# GMAF, Inc., Freeport, N.Y.
AN IMPROVED LAMBDA-SCHEME FOR ONE-DIMENSIONAL FLOWS Final Report

Gino Moretti and Michael T. DiPiano Washington NASA Sep. 1983 72 p refs
(Contract NAS1-16946)
(NASA-CR-3712; NAS 1.26:3712) Avail: NTIS HC A04/MF A01 CSCL 01A

A code for the calculation of one-dimensional flows is presented, which combines a simple and efficient version of the lambda-scheme with tracking of discontinuities. The latter is needed to identify points where minor departures from the basic integration scheme are applied to prevent infiltration of numerical errors. Such a tracking is obtained via a systematic application of Boolean algebra. It is, therefore, very efficient. Fifteen examples are presented and discussed in detail. The results are exceptionally good. All discontinuites are captured within one mesh interval.
Author

N83-33854*# Old Dominion Univ., Norfolk, Va.
LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A WING-WINGLET MODEL DESIGNED AT M = 0.8, C SUB L = 0.4 USING LINEAR AERODYNAMIC THEORY Contractor Report, Aug. 1982 - Jun. 1983
John M. Kuhlman Jul. 1983 233 p
(Grant NsG-1357)
(NASA-CR-172186; NAS 1.26:172186) Avail: NTIS HC A11/MF A01 CSCL 01A

Wind tunnel test results have been presented herein for a subsonic transport type wing fitted with winglets. Wind planform was chosen to be representative of wings used on current jet transport aircraft, while wing and winglet camber surfaces were designed using two different linear aerodynamic design methods. The purpose of the wind tunnel investigation was to determine the effectiveness of these linear aerodynamic design computer codes in designing a non-planar transport configuration which would cruise efficiently. The design lift coefficient was chosen to be 0.4, at a design Mach number of 0.8. Force and limited pressure data were obtained for the basic wing, and for the wing fitted with the two different winglet designs, at Mach numbers of 0.60, 0.70, 0.75 and 0.80 over an angle of attack range of -2 to +6 degrees, at zero sideslip. The data have been presented without analysis to expedite publication.
Author

N83-33855# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.
UNSTEADY PRESSURE AND BOUNDARY LAYERS ON AN 0012 AIRFOIL CAUSED BY AERODYNAMIC INTERFERENCE Annual Report, 1 Sep. 1981 - 31 Aug. 1982
Eugene E. Covert and Peter F. Lorber Aug. 1982 47 p refs
(Grant AF-AFOSR-0282-80)
(AD-A126799; AFOSR-33-0200TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

Aerodynamic characteristics were measured for a NACA 0012 airfoil in a nonuniform unsteady flow field. Reduced frequencies based on semichord of 0 to 6.4 Reynolds number of 700,000 to 1,450,000, and airfoil angles of attack of 0 to 15 deg were studied. Upwash velocity fields, turbulent boundary layer velocities and Reynolds stresses, and attached and separated flow pressure distributions were measured. The influence of frequency, pressure gradient, unsteady amplitude and measurement location are discussed. It is found that superposition of unsteady and mean quantities appears to be valid for low pressure gradient attached flow, but becomes increasingly inadequate as separation is approached. Propagation of unsteady pressure in separated flow resembles a superposition of a disturbance convected downstream from the leading edge onto the standing wave pattern found in attached flow.
GRA

N83-33856# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
AN ENGINEERING METHOD FOR ESTIMATING THE AERODYNAMIC CHARACTERISTICS OF CIRCULATION CONTROL WINGS (CCW) Final Report
Campbell Henderson 1 Jun. 1982 37 p refs
(AD-A126436; NADC-82186-60) Avail: NTIS HC A03/MF A01 CSCL 01/3

A semiempirical prediction technique development for the general class of Circulation Control Wing (CCW) STOL Aircraft is presented. The application of circulation control for high lift by tangential blowing over the bluff trailing edge of airfoils was carried out principally by the DTNSRDC. A large body of two dimensional airfoil data was built up with subsequent extension to three dimensional models and finally to full scale flight demonstrator aircraft. The CCW capability was successfully proven in the Grumman A-6/CCW demonstrator vehicle. Development of a V/STOL Manual/DATCOM type of engineering prediction technique is made possible by the extensive DTNSRDC data base. The approach taken was to correlate all available two dimensional CCW data with appropriate geometric and flow variables. The resulting charts permit empirical prediction of 2D lift, drag and moment characteristics of candidate airfoils. Predictions of the complete 3D CCW system, normally having partial span blowing, then employs application of three dimensional factors, verified through comparisons with complete vehicle model tests.
GRA

N83-33857# Neilsen Engineering and Research, Inc., Mountain View, Calif.
RESEARCH ON TOPICS IN TRANSONIC FLOW THEORY AND ADAPTIVE GRID GENERATION Annual Technical Report, 1 Feb. 1982 - 31 Jan. 1983
David Nixon and Goetz H. Klopfer Feb. 1983 12 p refs
(Contract F49620-79-C-0054; AF Proj. 2307)
(AD-A128485; AFOSR-83-0424TR) Avail: NTIS HC A02/MF A01 CSCL 20/4

This report summarizes work concerned with some topics connected with a transonic flow theory and also some problems in adaptive mesh procedures. The work on adaptive mesh procedures is concerned with the development of adaptive mesh strategies and solution procedures for highly clustered adaptive meshes. It has been found that the strong conservation law form of the governing equations in computational variables cannot capture the shock waves correctly for arbitrary clustering. Methods for correcting this problem have been investigated. The work on transonic flow theory is concerned with the existence of multiple solutions in full potential calculations. Since the full potential equation is difficult to analyze compared with small disturbance equation, multiple solutions have been found using transonic small disturbance theory. These results have been analyzed using the transonic integral equation theory and indicate that the transonic potential theory is not formulated uniquely.
GRA

N83-33858# Sandia Labs., Albuquerque, N. Mex.
WAKES OF ISOLATED DARRIEUS TURBINES
R. E. Akins 1983 10 p refs Presented at 6th Biennial Wind Energy Conf., Minneapolis, 1 Jun. 1983
(Contract DE-AC04-76DP-00789)
(DE83-011501; SAND-82-25520; CONF-830631-1) Avail: NTIS HC A02/MF A01

A knowledge of the flow structure in the wake of a wind turbine which is important in the design of arrays of units to be used in wind farm applications is discussed. An experimental program to measure the wake structure downwind of a 17m Darrieus vertical axis wind turbine was completed. Mean velocity deficits were measured as a function of tip speed ratio and incident wind direction for several downstream locations. Existing models are analyzed. The capability to predict performance of clusters of wind turbines is improved.
DOE

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N83-33859*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

TABULATION OF RECORDED GUST AND MANUEVER ACCELERATIONS AND DERIVED GUST VELOCITIES AND AIRPLANES IN THE NASA VGH GENERAL AVIATION PROGRAM
Joseph W. Jewel, Jr. Sep. 1983 33 p refs
(NASA-TM-84660; L-15613; NAS 1.15:84660) Avail: NTIS HC A03/MF A01 CSCL 01C

Tables of incremental gust and maneuver accelerations in 0.1g intervals (above preselected threshold values) and derived gust velocities in intervals of 4 ft/sec are presented for 95 general aviation airplanes flown for 35,286 hours in 9 types of operations. Author

N83-33860# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
CENTRIFUGE TESTS OF MODIFICATIONS TO THE MA-2 AIRCREWMAN TORSO HARNESS, PHASE 1 Preliminary Report
Dan Lorch 4 Dec. 1982 28 p refs
(AD-A126416; NADC-82126-60) Avail: NTIS HC A03/MF A01 CSCL 01/3

Inadequate aircrew restraint was cited as a factor which has caused the loss of many aircraft. Several modifications of the MA-2 torso harness were tested by live subjects on the NAVAIRDEVCEN centrifuge at an acceleration of -2Gz, and also in a -2Gx simulated flat spin in order to detemine how much improvement was made to the restraint system. A 2 cm reduction in Z-displacement could be obtained with either a negative G strap or a 'V' strap over the thighs. GRA

N83-33861# Mitre Corp., McLean, Va. Metrek Div.
POTENTIAL FUEL SAVINGS OF SPECIFIC ATC SYSTEM IMPROVEMENTS Final Report
Richard A. Rucker Feb. 1982 160 p refs
(Contract DOT-FA01-82-C-10003)
(AD-A126449; MTR-81W275; FAA-EM-82-11) Avail: NTIS HC A08/MF A01 CSCL 21/4

Procedural restrictions are often imposed by the current ATC system upon the choice of routes and altitudes that the airspace user may fly. ATC imposed delays before departure, while en route, or before landing are also a common experience. To the extent that such restrictions and delays impose fuel or time penalties, they are of concern to today's fuel/cost conscious airspace user. To the extent they are needed to resolve actual conflicts between aircraft competing for the use of common airspaces or runways, they are essential for maintaining air safety. However, to the extent that they simply 'separate aircraft from otherwise empty airspace or runways', they impose unnecessary and costly penalties on the airspace users. The results of two studies of these problems and some unpublished case studies are presented in an attempt to better understand the causes and consequences of specific restrictions and delays to IFR flight movements. The potential for fuel savings if the ATC system could be improved to the point where only those restrictions and delays actually needed to insure flight safety are actually imposed is estimated. These potential fuel savings are allocated as the estimated benefits of five specific ATC system functional improvements now being considered. GRA

N83-33862# Naval Postgraduate School, Monterey, Calif.
A COMPARISON OF AUDIO, VISUAL AND TACTILE WARNING DEVICES IN A SIMULATED FLIGHT ENVIRONMENT M.S. Thesis
Robert Joseph Larkin Mar. 1983 45 p refs
(AD-A128200) Avail: NTIS HC A03/MF A01 CSCL 05/10

An experiment was performed in which fifteen subjects responded to three separate warning devices; an audio; visual, and tactile device. Reaction times to each randomly presented device were measured while each subject was simultaneously engaged in piloting a personal flight simulator. Instructions to the subjects were continually presented visually on a TV monitor and verbally through a set of earphones. The mean reactions times for each device were compared using a difference of means t-test. The results showed that the tactile device produced significantly faster reaction times at the alpha = .01 significance level. This led to the conclusion that a tactile warning device could be effective in a flight environment where visual and auditory senses can easily be overloaded. GRA

N83-33863# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Biomechanical Protection Branch.
IMPACT TESTS OF HBU-X AUTOMATIC LAP BELT PROTOTYPES
James W. Brinkley and Dale E. Schimmel Sep. 1982 12 p refs (AF Proj. 7231)
(AD-A128182; AFAMRL-TR-82-66) Avail: NTIS HC A02/MF A01 CSCL 13/12

Impact tests were conducted to evaluate three preproduction HBU-X automatic lap belts of different designs developed by three competing contractors. Eight impact tests were performed as part of a program to select a lap belt to replace all HBU and MA-5/6 series lap belts currently in service. Each lap belt was to be tested at progressively higher G levels (32 G, 38 G, and 40 G) and velocities (up to 106 ft/sec) until failure occurred or until the 40 G test level was achieved without failure. Each of the lap belts failed structurally or exceeded the belt adjuster slippage limit (1/2 in.) during the impact tests. Further tests of a single buckle that did not structurally fail in the test series and adjusters that passed the slippage criteria are recommended. Author (GRA)

N83-33864# Feecon Corp., Westborough, Mass.
AIR TRANSPORTABLE AS32/P-4 CRASH RESCUE VEHICLE Final Report, Sep. 1979 - May 1980
John Gagliardo, James ORegan, Joseph Walker, and Anthony Kwan Tyndall AFB, Fla. Air Force Engineering and Services Center Mar. 1983 86 p
(Contract F08635-79-C-0286; AF Proj. 2505)
(AD-A128068; AFESC/ESL-TR-81-14) Avail: NTIS HC A05/MF A01 CSCL 13/12

The objective of this project was to develop an alternate turret configuration on the AS32/P-4 (P-4) which enables the vehicle to be air transported without disassembling the fire suppression system. Four Air Force P-4 vehicles were modified, tested, and evaluated. Modifications consisted of removing the roof turret and associated compounds. The original bumper turret was replaced by a large capacity (800 GPM) non-air-asperating turret. This large capacity turret can be operated either hydraulically or manually. Four fire tests were conducted comparing the original configuration with the modified configuration. The modification proved to be highly successful. The non-air aspirating turret was shown to have twice the effective discharge range. The modified vehicles can be air transported on a C-130 aircraft without disassembly of the fire suppression system. Author (GRA)

N83-33829*# National Aeronautics and Space Administration, Washington, D. C.
NASA'S AVIATION SAFETY - METEOROLOGY RESEARCH PROGRAMS
Roger L. Winblade *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 17-18 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 01C

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N83-33865*# Ohio Univ., Athens. Dept. of Electrical and Computer Engineering.
MODIFIED TIMING MODULE FOR LORAN-C RECEIVER
Robert W. Lilley Aug. 1983 11 p refs
(Contract NGR-36-009-017)
(NASA-CR-173038; NAS 1.26:173038; TM-87) Avail: NTIS HC A02/MF A01 CSCL 17G

Full hardware documentation is provided for the circuit card implementing the Loran-C timing loop, and the receiver event-mark and re-track functions. This documentation is to be combined with overall receiver drawings to form the as-built record for this device. Computer software to support this module is integrated with the remainder of the receiver software, in the LORPROM program. Author

N83-33866*# Ohio Univ., Athens. Dept. of Electrical and Computer Engineering.
MODIFIED TIMING MODULE FOR LORAN-C RECEIVER
Robert W. Lilley Jun. 1983 11 p refs
(Grant NGR-36-009-017)
(NASA-CR-173032; NAS 1.26:173032; TM-87) Avail: NTIS HC A02/MF A01 CSCL 17G

Hardware documentation is provided for the modified LORAN-C timing module, which uses interrupt-driven software control in determining loop sample times. Computer loading is reduced by eliminating polled operation of the timing loop. Author

N83-33867*# Ohio Univ., Athens. Avionics Engineering Center.
AREA NAVIGATION IMPLEMENTATION FOR A MICROCOMPUTER-BASED LORAN-C RECEIVER
Fujiko Oguri Aug. 1983 150 p refs
(Grant NGR-36-009-017)
(NASA-CR-173048; NAS 1.26:173048; TM-88) Avail: NTIS HC A07/MF A01 CSCL 17G

Engineering performed to make LORAN-C a more useful and practical navigation system for general aviation is described. Development of new software, and implementation of this software on a (MOS6502) microcomputer to provide high quality practical area navigation information directly to the pilot and considered. Flight tests were performed specifically to examine the efficacy of this new software. Final results were exceptionally good and clearly demonstrate the merits of this new LORAN-C area navigation system. Author

N83-33868# Stanford Univ., Calif.
RESEARCH ON NEW APPROACHES TO OPTICAL SYSTEMS FOR INERTIAL ROTATION SENSING Final Report, 1 Jan. 1981 - 30 Apr. 1982
Mar. 1983 136 p refs
(Contract F49620-80-C-0040)
(AD-A126803; AFOSR-83-0218TR; SU-GL-3552) Avail: NTIS HC A07/MF A01 CSCL 17/7

Novel fiber optic Sagnac loop configurations for inertial rotation sensing fiber gyros was investigated. The passive reentrant Sagnac system (PRS), in which two identical optical signals circulate around a multiturn loop many times, with successive samplings of the difference signal after each transit of the total loop, was tested in a rotating all fiber system. The successful operation of a reentrant Sagnac system and the tremendous value of the various fiber components developed in this laboratory which enable an all-fiber system to be used for this recirculating mode of operation of a fiber gyro is demonstrated. A bilateral amplifier will be incorporated in the fiber loop. This device is known as the active reentrant Sagnac system (ARS). GRA

N83-33869# Naval Postgraduate School, Monterey, Calif.
INERTIAL NAVIGATION SYSTEMS AIDED BY G.P.S. M.S. Thesis
Constantinos Christou Safliania Dec. 1982 115 p refs
(AD-A126689) Avail: NTIS HC A06/MF A01 CSCL 17/7

The present work is a Kalman filter study, indirect feedback configuration, for a proposed integrated inexpensive Inertial Navigation System/Global Positioning System (I.N.S./G.P.S.). A one nautical mile per hour, local-level, two accelerometer I.N.S. is used where the errors are represented by a 7 state linear model. G.P.S. is assumed to provide four range measurements from an equal number of satellites with the best relative position among those in view. I.N.S. error analysis showed error dependence on Schuler frequency and that it was possible to neglect Foucault modulation for navigation purposes. B.W.

N83-33870# Burroughs Corp., Paoli, Pa. Federal and Special Systems Group.
SYSTEM DESCRIPTION FOR AUTOMATED RADAR TERMINAL AIR TRAFFIC CONTROL SYSTEM (ARTS II): ENHANCEMENTS. SYSTEM DECRIPTION, REVISION A Final Report
15 Oct. 1982 61 p
(Contract DTFA01-82-C-10008)
(AD-A128896; DOT/FAA/PM-83/19) Avail: NTIS HC A04/MF A01 CSCL 17/9

This document provides a system description of the ARTs IIA hardware and software. ARTS IIA is an expansion of the existing Automated Radar Terminal System (ARTS II). The expansion provides a safety package that includes beacon target tracking, minimum safe altitude warning and aircraft conflict alert. The warning and alert functions include the addition of an aural alarm and additional display data. An integrated target generator has been added to provide test and training modes of operation. Data extraction and reduction functions have been included to aid in the development testing. To provide for increased performance and memory capacity, the computer has been upgraded and new software developed. Except for the processor, all ARTS II hardware has been retained. Brief descriptions of this hardware and the aural alarm unit are contained in Section 1. Section 2 contains a description of the existing, modified and new software functions. Section 3 contains the system performance requirements. Author (GRA)

N83-33871# Federal Electric Corp., Vandenberg AFB, Calif. Systems Performance Analysis Dept.
GPS (GLOBAL POSITIONING SYSTEM) ERROR BUDGETS, ACCURACY AND APPLICATIONS CONSIDERATIONS FOR TEST AND TRAINING RANGES Final Report
Richard A. Brooks, Hugh A. Eakin, Joe C. Warnock, George R. McKelvey, Steven A. Cresswell, Robert L. Baker, Morgan Kuo, Greg S. Boyland, William F. Cackler, and Beulah A. Kirkham Dec. 1982 167 p refs
(Contract F04703-81-C-0101)
(AD-A128955; WSMC-TR-82-2; AS300-T-82-33) Avail: NTIS HC A08/MF A01 CSCL 17/7

A Triservices study, currently in progress, will develop representative test and training range instrumentation configurations based on NAVSTAR Global Positioning System (GPS) technology, evaluate performance capabilities, and develop cost information. During the early phase of the study a collection of GPS documentation was established for reference purposes. This documentation along with experience from other GPS projects at WSMC provided the basis for the report. This report provides information that should be useful to range analysts developing and evaluating GPS-based instrumentation concepts at the test and training ranges. Some of the subjects are not thoroughly developed and may require further work. Subjects addressed include definition of performance evaluation terms, Doppler data processing, use of pseudo-satellite ground stations, two and three dimensional solutions, receiver and

translator configurations, and vehicle dynamics effects on receiver operation. GRA

N83-33872# Sandia Labs., Albuquerque, N. Mex. Guidance and Control Div.
INERTIAL NAVIGATION SYSTEM FOR DIRECTIONAL SURVEYING
Stewart M. Kohler Sep. 1982 31 p
(Contract DE-AC04-76DP-00789)
(DE83-000406; SAND-82-1668) Avail: NTIS HC A03/MF A01

A Wellbore Inertial Navigation System (WINS) was developed and tested. Developed for directional surveying of geothermal, oil, and gas wells, the system uses gyros and accelerometers to obtain survey errors of less than 10 ft (approximately 3 m) in a 10,000 ft (approximately 300 m) well. The tool, which communicates with a computer at the surface, is 4 in. (approximately 10 cm) in diameter and 20 ft (approximately 6.1 m) long. The concept and hardware is based on a system developed for flight vehicles. DOE

N83-33873# Department of Transportation, Washington, D. C. Research and Special Programs Administration.
HISTORY AND STATUS OF THE US MARINE RADIOBEACON SYSTEM Final Report, Jan. - Nov. 1982
Arthur E. OBrien Feb. 1983 69 p refs
(PB83-184358; DOT-TSC-CG-82-7; DOT-CG-N-1-82) Avail: NTIS HC A04/MF A01 CSCL 17G

The U.S. Marine Radiobeacon System became operational with three transmitter sites and a handful of users in 1921 under the jurisdiction of the Lighthouse Service of the Department of Commerce. The system grew rapidly from the time of its inception. By 1939, when the Coast Guard assumed system responsibility, the number of transmitter sites had grown to 141 with an estimated 4,000 users. By January of 1982, the system consisted of 198 transmitter sites with an estimated 423,000 users, most of whom were pleasure boat owners. The development of this system and reports on its current status and near term future prospects are reported. GRA

N83-33874# Transportation Systems Center, Cambridge, Mass.
SPECIFICATION OF THE TRANSMITTED SIGNAL OF THE US MARINE RADIOBEACON SYSTEM Final Report, Jan. - Nov. 1982
Arthur E. OBrien Jan. 1983 19 p
(PB83-184317; DOT-TSC-CG-82-6; DOT-CG-N-2-82) Avail: NTIS HC A02/MF A01 CSCL 17G

The specification of the transmitted signal of the U.S. Marine Radiobeacon System is documented. It is intended as a reference document consisting of specifications, definitions, and explanations for general use by designers, manufacturers, and users of the system. GRA

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-33875*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Chemistry.
A FUNDAMENTAL APPROACH TO THE STICKING OF INSECT RESIDUES TO AIRCRAFT WINGS Semiannual Technical Report
N. S. Eiss, Jr. and J. P. Wightman Jul. 1983 17 p refs
(Grant NAG1-300)
(NASA-CR-173063; NAS 1.26:173063) Avail: NTIS HC A02/MF A01 CSCL 01C

The sticking of insect residues to aircraft wings is investigated. The major topics of this review are: Experimentally tested methods, testing techniques, the effect of surface roughness height on aerodynamic drag, materials tested and, the adhesive properties of insect body fluids are reviewed. S.L.

N83-33876*# Kentron International, Inc., Hampton, Va.
EFFECT OF ADVANCED TECHNOLOGY AND A FUEL EFFICIENT ENGINE ON A SUBSONIC-CRUISE EXECUTIVE JET WITH A SMALL CABIN
F. L. Beissner, Jr., W. A. Lovell, A. Warner Robins, and E. E. Swanson Aug. 1983 58 p refs
(Contract NAS1-16000)
(NASA-CR-172190; NAS 1.26:172190) Avail: NTIS HC A04/MF A01 CSCL 01C

An analytical study of a supersonic-cruise, executive, jet aircraft indicated the effects of using advanced technology. The twin-engine, arrow-wing vehicle was configured with a cabin of minimum practical size to hold one pilot, eight passengers, and their baggage. The primary differences between this configuration that of a previous report were the reduction in cabin size and the use of engines that are more fuel-efficient. Both conceptual vehicles are capable of forming the same mission. The current vehicle has a range of 3,350 nautical miles at Mach 2.3 cruise and 2,700 nautical miles at Mach 0.9. The concept description includes configuration definition, aerodynamic and propulsion-system characteristics, and mass properties. Performance analyses are documented for intercontinental and transcontinental flight profiles. In the latter case, a reduction in sonic-boom overpressure from 1.3 to 1.0 pounds per square foot was achieved by varying the flight profile slightly from that for optimum performance. Author

N83-33877# Toronto Univ. (Ontario). Inst. for Aerospace Studies.
A STUDY OF LATERAL FLIGHT PATH PERTURBATIONS OF STOL AIRCRAFT IN THE PLANETARY BOUNDARY LAYER
Meyer A. Nahon Jun. 1983 136 p refs
(UTIAS-TN-240; ISSN-0082-5263) Avail: NTIS HC A07/MF A01

A wind tunnel investigation of the characteristics of turbulence encountered by STOL aircraft during steep descents was performed. The experimental results were used as input to a mathematical model of the linearized lateral equations of motion of a typical STOL aircraft, yielding the root-mean-square dispersion of the lateral state variables from a nominal flight path. Single and four point aircraft approximation were considered; the former accounting only for side gusts, and the latter including rolling, and longitudinal and lateral yawing gust gradients. The single-point approximation proved to be inadequate for estimating lateral dispersions from the glidescope. Dispersion contributions due to rolling, and longitudinal and lateral yawing gust gradients were separated for the four point approximation. Author

N83-33878# Cranfield Inst. of Tech., Bedfordshire (England). College of Aeronautics.
A NOTE ON THE ESTIMATION OF LONGITUDINAL AND LATERAL AIRCRAFT DERIVATIVES USING SEMI-EMPIRICAL METHODS
R. Thorne May 1983 39 p refs
(CAR-8312; ISBN-0-902937-85-5) Avail: NTIS HC A03/MF A01

A number of semi-empirical and theoretical techniques are used to estimate the longitudinal and lateral aerodynamic derivatives of a twin turboprop aircraft, the HP Jetstream. Estimates of the aircraft derivatives are performed for aircraft in a typical cruise condition. Longitudinal parameters are calculated using classical theory and lateral derivatives are calculated using the semi-empirical methods of ESDU. Author

N83-33879# Naval Ship Research and Development Center, Bethesda, Md. Aviation and Surface Effects Dept.
SHORT TAKEOFF PERFORMANCE USING A GRAVITY ASSIST SKI JUMP Final Report
Roger J. Furey Mar. 1983 33 p refs
(AD-A126456; DTNSRDC-83/020; DTNSRDC/AERO-1281) Avail: NTIS HC A03/MF A01 CSCL 01/3

A modified or gravity assist ski jump was developed, through an application of the calculus of variations, to provide for the

shortest takeoff roll for a thrust vector control type vertical or short takeoff and landing (V/STOL) aircraft that will maintain a better than minimum required rate of climb. The equations of motion are programmed to model the takeoff performance using a ski jump. The model compares well with the ski jump test results of the AV-8A aircraft. It is shown that reduction of 30% in required ground roll and 20% in distance to a 50 ft altitude, while maintaining a better than minimum required rate of climb, with the modified ramp. A simple modified ramp, using a pair of standard multiple girder bridging (MGB) ramps, provides similar improvements in takeoff performance. GRA

N83-33880# *United Technologies Corp., Stratford, Conn. Aircraft Div.*
X-WING 25 FOOT DIAMETER LOCKHEED MODEL WHIRL TEST REPORT Progress Report, Feb. - Oct. 1982
J. P. Perschbacher 17 Jan. 1983 223 p refs
(Contract MDA903-81-C-0281)
(AD-A128959; SER-510072) Avail: NTIS HC A10/MF A01 CSCL 01/3

This test on the Lockheed designed 25 foot diameter X-Wing rotor had four purposes: (1) to expand the operating envelope to tip speeds of 700 ft/sec. and CT/o of .20; (2) to investigate track and balance sensitivities; (3) to evaluate the control system response characteristics at the higher disc loading; (4) to correlate CCHAP and CRUISE 4 analytical predictions with test data; and (5) to evaluate downwash on the close proximity fuselage. GRA

N83-33881# Utah Univ., Salt Lake City. Dept. of Computer Science.
INTERACTIVE SPLINE MODELLING Final Report, 1 Sep. 1982 - 28 Feb. 1983
Elaine Cohen 27 Apr. 1983 7 p refs
(Contract DAAG29-82-K-0176)
(AD-A128841; ARO-19941.1-MA) Avail: NTIS HC A02/MF A01 CSCL 12/1

This contract has initiated explorations into the advantages of interactive environments for developing computer based spline representations and the types of moderately complex objects for which it might be suitable. Additionally mathematical tools for surface fitting and modification in an interactive environment are investigated in the context of modelling a helicopter in this environment. Author (GRA)

N83-34098# Ministry of Defence, Harefield (England). Directorate of Future Systems.
AN ASSESSMENT OF THE IMPORTANCE OF SMALL CRACK GROWTH TO AIRCRAFT DESIGN
R. F. W. Anstee *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 9 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

N83-34099# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
USE OF SMALL CRACK DATA TO BRING ABOUT AND QUANTIFY IMPROVEMENTS TO AIRCRAFT STRUCTURAL INTEGRITY
J. M. Potter and B. G. W. Yee (General Dynamics Corp., Fort Worth, Tex.) *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 13 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

N83-34110# Battelle Memorial Inst., Columbus, Ohio.
DISCUSSION OF THE SHORT CRACK EFFECT IN AIRFRAME MATERIALS AND COMPONENTS
Brian Leis *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 12 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N83-33882* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
AIRCRAFT BODY-AXIS ROTATION MEASUREMENT SYSTEM Patent
Kenneth T. Cowdin, inventor (to NASA) Issued 14 Jun. 1983 10 p Filed 11 Mar. 1981 Supersedes N81-22048 (19 - 13, p 1718)
(NASA-Case-FRC-11043-1; US-Patent-4,387,513;
US-Patent-Appl-SN-242790; US-Patent-Class-33-322;
US-Patent-Class-74-5.34) Avail: US Patent and Trademark Office CSCL 01D

A two gyro four gimbal attitude sensing system having gimbal lock avoidance is provided with continuous azimuth information, rather than roll information, relative to the magnetic cardinal headings while in near vertical attitudes to allow recovery from vertical on a desired heading. The system is comprised of a means for stabilizing an outer roll gimbal that is common to a vertical gyro and a directional gyro with respect to the aircraft platform which is being angularly displaced about an axis substantially parallel to the outer roll gyro axis. A means is also provided for producing a signal indicative of the magnitude of such displacement as an indication of aircraft heading. Additional means are provided to cause stabilization of the outer roll gimbal whenever the pitch angle of the aircraft passes through a threshold prior to entering vertical flight and destabilization of the outer roll gimbal upon passing through the threshold when departing vertical flight.
Official Gazette of the U.S. Patent and Trademark Office

N83-33883*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE NASA HIGH ACCURACY FUEL FLOWMETER (HAFF) DEVELOPMENT PROGRAM
Howard F. Hobart 1983 6 p ref Presented at CECON '83, Cleveland, 4-5 Oct. 1983; sponsored by IEEE
(NASA-TM-83484; E-1807; NAS 1.15:83484) Avail: NTIS HC A02/MF A01 CSCL 01D

The high accuracy fuel flowmeter development program is described. A flightworthy meter that measures mass flowrate of aircraft fuels to within + or - 0.25% of reading over a 50:1 range of flow is developed. A study of measurement techniques to achieve this goal yielded three candidates: (1) a dual turbine flowmeter with density and viscosity compensation; (2) an angular momentum flowmeter with a motor-driven, spring-restrained turbine and viscosity shroud; and (3) a vortex precission flowmeter with density and viscosity compensation. An experimental study of each technique was completed and the first two candidates were selected for prototype development. S.L.

N83-33835*# Transportation Systems Center, Cambridge, Mass.
CURRENT STATUS OF VISIBILITY SENSORS FOR AVIATION
David C. Burnham *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 47-56 Original contains color illustrations
(For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 01D

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-33884* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
NOISE SUPPRESSOR FOR TURBO FAN JET ENGINES Patent
Dah Y. Cheng, inventor (to NASA) (Santa Clara Univ., Calif.) Issued 8 Feb. 1983 8 p Filed 13 Feb. 1976 Supersedes N76-118131 (15 - 9, p 1082) Sponsored by NASA
(NASA-Case-ARC-10812-1; US-Patent-4,372,110; US-Patent-Appl-SN-657903; US-Patent-Class-60-262; US-Patent-Class-60-269; US-Patent-Class-60-271; US-Patent-Class-239-265.17; US-Patent-Class-181-213) Avail: US Patent and Trademark Office CSCL 21E

A noise suppressor is disclosed for installation on the discharge or aft end of a turbo fan engine. Within the suppressor are fixed annular airfoils which are positioned to reduce the relative velocity between the high temperature fast moving jet exhaust and the low temperature slow moving air surrounding it. Within the suppressor nacelle is an exhaust jet nozzle which constrains the shape of the jet exhaust to a substantially uniform elongate shape irrespective of the power setting of the engine. Fixed ring airfoils within the suppressor nacelle therefore have the same salutary effects irrespective of the power setting at which the engine is operated.Official Gazette of the U.S. Patent and Trademark Office

N83-33885# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md. Chemical Propulsion Information Agency.
COMPUTATIONAL METHODS FOR RAMJETS. JPM SPECIALIST SESSION
Debra Sue Eggleston, ed. Feb. 1983 66 p refs Meeting held in Monterey, Calif., 15 Feb. 1983
(Contract N00024-83-C-5301)
(AD-A128297; CPIA-Publ-373) Avail: NTIS HC A04/MF A01 CSCL 21/5

This publication is a collection of papers presented at the 15 February 1983 specialist session on computational methods for ramjets. The session was held in conjunction with the 1983 Joint Army-Navy-NASA-Air Force (JANNAF) Propulsion Meeting (JPM) at the Naval Postgraduate School, Monterey, California. The papers deal with the application of computational models and numerical methods to the computer solution of inlet and combustor flow field properties in ramjet and supersonic combustion ramjet engines. For individual titles, see N83-33886 through N83-33890.

N83-33886# California Inst. of Tech., Pasadena.
LINEAR THEORY OF PRESSURE OSCILLATIONS IN LIQUID FUELED RAMJET ENGINES
F. E. C. Culick and V. Yang *In* APL Computational Methods for Ramjets Feb. 1983 p 1-8 refs (For primary document see N83-33885 22-07)
Avail: NTIS HC A04/MF A01 CSCL 21/5

Low frequency pressure oscillations in ramjet engines are treated within the one-dimensional approximation. The engine is treated in two main parts: the inlet-section, containing relatively high speed flow, and the combustion chamber. A linearized analysis of a normal shock exposed to acoustic waves provides the upstream boundary condition. Most of the work reported here has been concerned with the combustion chamber. A simple model of the steady flow in a dump combustor has been worked out, comprising three regions: the flow of unburnt reactions; the region containing products of combustion; and the recirculation zone. Combustion is assumed to occur in an infinitesimally thin sheet; an infinitesimally thin shear layer separates the recirculation zone from the remainder of the flow field. Acoustic fields in the inlet and the combustion chamber are formed separately and joined at the dump plane to provide a transcendental equation for the computer wave number. Results for the frequencies of oscillations and the pressure distributions compare well with experimental data taken at the Naval Weapons Center, China Lake. B.W.

N83-33887*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NUMERICAL STUDY OF SCRAMJET AND RAMJET FLOW FIELDS
Ajay Kumar and J. Philip Drummond *In* APL Computational Methods for Ramjets Feb. 1983 p 9-24 refs (For primary document see N83-33885 22-07)
Avail: NTIS HC A04/MF A01 CSCL 21/5

Two computer programs have been developed to numerically calculate complex, two-dimensional flow fields in scramjets. The first program is written for inlet analysis whereas the second program is written primarily for combustor analysis. Both programs solve the full two-dimensional Navier-Stokes equations by a well-known explicit, predictor-corrector technique. Turbulence is modeled by an algebraic eddy-viscosity model. The combustor program also includes one or more species conservation equations to calculate mixing and reacting flows. The hydrogen/air chemistry in this program is modeled by a complete reaction model. The combustor program has been recently modified to analyze axisymmetric ramjet dump combustor flow field. Results from these computer programs are presented that predict the flow in several scramjet inlet configurations, two model scramjet engine configurations, and in a dump combustor simulator. Computed results are also compared with available experimental data to allow assessment of the programs. Author

N83-33888*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NUMERICAL ANALYSIS OF A SCRAMJET INLET FLOW FIELD USING THE THREE-DIMENSIONAL NAVIER-STOKES EQUATIONS
Ajay Kumar *In* APL Computational Methods for Ramjets Feb. 1983 p 25-40 refs (For primary document see N83-33885 22-07)
Avail: NTIS HC A04/MF A01 CSCL 21E

A computer program has been developed to analyze supersonic combustion ramjet (scramjet) inlet flow fields. The program solves the three-dimensional Euler or Navier-Stokes equations in full conservation form by a well-known explicit, predictor-corrector technique. Turbulence is modeled by an algebraic eddy-viscosity model. Detailed laminar and turbulent flow results are presented for a symmetric wedge corner and a comparison is made with the available experimental results to allow assessment of the program. Results are then presented for an actual scramjet inlet configuration. Author

N83-33889# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
CALCULATION OF INVISCID AIR CAPTURE AND ADDITIVE DRAG FOR 3-D SUPERSONIC INLET FLOWS
Michael D. Griffin *In its* Computational Methods for Ramjets Feb. 1983 p 41-50 refs (For primary document see N83-33885 22-07)
Avail: NTIS HC A04/MF A01 CSCL 21/5

A method for the computation of air capture ratio and additive drag for supersonic inlets is presented. A streamline tracing approach is used, where stored data for the inlet shock-layer flowfield is used to define a stream tube at the cowl lip. This stream tube is then integrated backwards to the external bow shock, at which point the air capture envelope is defined. The additive drag is available as the integral of pressure over the axial component of this envelope. The method allows an arbitrary approach to the computation of the original flowfield data. The present work illustrates the application of the method to annular scramjet inlet configurations, but such an inlet design is not required, and the method can be used whenever a cowl lip geometry can be defined, and flowfield data computed from the freestream to the cowl lip. Author

N83-33890# Cooper Union, New York. School of Engineering.
AN ASSESSMENT OF GLOBAL AND QUASI-GLOBAL MODELS OF HYDROCARBON AND HYDROGEN COMBUSTION KINETICS FOR REACTING FLOW-FIELD CALCULATIONS
W. Chinitz *In* APL Computational Methods for Ramjets Feb. 1983 p 51-60 refs (For primary document see N83-33885 22-07) Avail: NTIS HC A04/MF A01 CSCL 21/5

The current availability of global and quasi-global chemical kinetic mechanisms describing hydrocarbon and hydrogen oxidation kinetics is critically reviewed. The advantages and disadvantages of both types of mechanisms are discussed and it is concluded that from the viewpoint of minimizing computer run times and computer storage requirements global models should be utilized whenever possible. Their primary limitation, however, is their inability to adequately represent species histories, particularly intermediate species. It is concluded that global models are available for hydrogen and hydrocarbon (propane and higher hydrocarbons) combustion in oxygen or air, and quasi-global models are available for the same hydrocarbons (aliphatic and cyclic). However, it is emphasized that, whenever possible, all global and quasi-global models should be checked against results obtained from complete mechanisms, since such checks may reveal inconsistencies in some aspects of the model. Author

N83-33891*# Princeton Univ., N. J. Dept. of Mechanical and Aerospace Engineering.
A FUEL-EFFICIENT CRUISE PERFORMANCE MODEL FOR GENERAL AVIATION PISTON ENGINE AIRPLANES Ph.D. Thesis. Final Report
Richard C. H. Parkinson Aug. 1983 400 p refs
(Contract NGL-31-001-252)
(NASA-CR-172188; NAS 1.26:172188; Rept-1527-T) Avail: NTIS HC A17/MF A01 CSCL 21E

A fuel-efficient cruise performance model which facilitates maximizing the specific range of General Aviation airplanes powered by spark-ignition piston engines and propellers is presented. Airplanes of fixed design only are considered. The uses and limitations of typical Pilot Operating Handbook cruise performance data, for constructing cruise performance models suitable for maximizing specific range, are first examined. These data are found to be inadequate for constructing such models. A new model of General Aviation piston-prop airplane cruise performance is then developed. This model consists of two subsystem models: the airframe-propeller-atmosphere subsystem model; and the engine-atmosphere subsystem model. The new model facilitates maximizing specific range; and by virtue of its implicity and low volume data storge requirements, appears suitable for airborne microprocessor implementation. Author

N83-33892*# National Aeronautics and Space Administration, Washington, D. C.
WINDMILLING OF THE ROTOR OF A TURBOJET ENGINE WITH AN AXIAL-FLOW COMPRESSOR UNDER FLIGHT CONDITIONS
Jan Borgon Jul. 1983 11 p refs Transl. into ENGLISH from Tech. Lotnicza i Astronautyczna (Poland), v. 30, Nov. 1975 p 34-36 Original language document was announced as A76-15825 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-77087; NAS 1.15:77087) Avail: NTIS HC A02/MF A01 CSCL 21E

The concept of rotor windmilling is understood to mean rotation of the rotor caused solely by the energy of the air (not gas) streaming through the apertures between the blades (under conditions of power shut-off) under the action of dynamic pressure. The concept of windmilling is analyzed for an engine with an axial-flow compressor, showing that windmilling must be taken into account in such cases as in-flight reignition of the engine. A graph-analytic method for determining the range of windmilling is proposed. Author

N83-33893*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PRELIMINARY TESTS OF AN ADVANCED HIGH-TEMPERATURE COMBUSTION SYSTEM
Jerrold D. Wear, Arthur M. Trout, John M. Smith, and Richard E. Jacobs Sep. 1983 33 p refs
(NASA-TP-2203; E-1633; NAS 1.60:2203) Avail: NTIS HC A03/MF A01 CSCL 21E

A combustion system has been developed to operate efficiently and with good durability at inlet pressures to 4.05 MPa (40 atm), inlet air temperatures to 900 K, and exhaust gas temperatures to 2480 K. A preliminary investigation of this system was conducted at inlet pressures to 0.94 MPa (9 atm), a nominal inlet air temperature of 560 K, and exhaust gas temperatures to 2135 K. A maximum combustion efficiency of 98.5 percent was attained at a fuel-air ratio of 0.033; the combustion efficiency decreased to about 90 percent as the fuel-air ratio was increased to 0.058. An average liner metal temperature of 915 K, 355 kelvins greater than the nominal inlet air temperature, was reached with an average exhaust gas temperature of 2090 K. The maximum local metal temperature at this condition was about 565 kelvins above the nominal inlet air temperature and decreased to 505 kelvins above with increasing combustor pressure. Tests to determine the isothermal total pressure loss of the combustor showed a liner loss of 1.1 percent and a system loss of 6.5 percent. Author

N83-33894*# Mechanical Technology, Inc., Latham, N. Y.
T55 POWER TURBINE ROTOR MULTIPLANE-MULTISPEED BALANCING STUDY
Michael R. Martin Feb. 1982 118 p refs
(Contract NAS3-19408)
(NASA-CR-167891; NAS 1.26:167891; MTI-83TR55) Avail: NTIS HC A06/MF A01 CSCL 21E

A rotordynamic analysis of the T55-L-11C engine was used to evaluate the balancing needs of the power turbine and to optimize the balancing procedure. As a result, recommendations were made for implementation of a multiplane-multispeed balancing plan. Precision collars for the attachment of trial weights to a slender rotor were designed enabling demonstration balancing on production hardware. The quality of the balance was then evaluated by installing a high speed balanced power turbine in an engine and running in a test cell at the Corpus Christi Army depot. The engine used had been tested prior to the turbine changeout and showed acceptable overall vibration levels for the engine were significantly reduced, demonstrating the ability of multiplane-multispeed balancing to control engine vibration. Author

N83-33895# Garrett Corp., Phoenix, Ariz. Pneumatic Systems Div.
DUAL-CHANNEL FUEL CONTROL PROGRAM, PHASE 3 Final Report
Mike Achmad Adelphi, Md. Harry Diamond Labs. 31 Jan. 1983 63 p
(Grant N00019-78-G-0288)
(AD-A126623; HDL-CR-82-288-2; Rept-41-3485) Avail: NTIS HC A04/MF A01 CSCL 21/5

A fluidic speed governor based on a laminar speed sensor for a duel channel fuel control was investigated. The program provides a control system to provide a military gas turbine powered vehicle with battlefield survivability and minimal restriction on the capability of completing the vehicle mission. It is shown that the laminar speed sensor can be used for closed loop speed control. It has the advantages of simplicity and decreased number of components as compared to other approaches, yet it shows a higher signal to noise ratio than presently used devices, provides directional sensing, and has an efficient mechanical pneumatic interface. GRA

N83-34832# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
PROFILE DESIGN FOR CASCADES [PROFILENTWURE FUER GITTER]
F. X. Wortmann *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1983 p 290-324 refs In GERMAN (For

primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

N83-34834# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
DESIGN OF SUPERCRITICAL BLADE CASCADES [ENTWURF SUPERKRITISCHER SCHAUFELGITTER]
E. Schmidt *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 341-378 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

N83-34838# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
THE EFFECT OF THE REYNOLDS NUMBER ON TURBOMACHINES [REYNOLDSZAHLEINFLUSS AUF STROEMUNGSMASCHINEN]
W. Huck *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 534-556 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N83-33896*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RESTRUCTURABLE CONTROLS
R. Jorge Montoya, comp. (Research Triangle Inst., Research Triangle Park, N.C.), W. E. Howell, comp., W. T. Bundick, comp., A. J. Ostroff, comp., Richard M. Hueschen, comp., and Christine M. Belcastro, comp. Aug. 1983 189 p refs Workshop held in Hampton, Va., 21-22 Sep. 1982
(NASA-CP-2277; L-15638; NAS 1.55:2277) Avail: NTIS HC A09/MF A01 CSCL 01C

Restructurable control system theory, robust reconfiguration for high reliability and survivability for advanced aircraft, restructurable controls problem definition and research, experimentation, system identification methods applied to aircraft, a self-repairing digital flight control system, and state-of-the-art theory application are addressed. For individual titles, see N83-33897 through N83-33903.

N83-33897*# Massachusetts Inst. of Tech., Cambridge.
ON RESTRUCTURABLE CONTROL SYSTEM THEORY
Michael Athans *In* NASA. Langley Research Center Restructurable Controls Aug. 1983 p 7-42 refs (For primary document see N83-33896 22-08)
Avail: NTIS HC A09/MF A01 CSCL 01C

The state of stochastic system and control theory as it impacts restructurable control issues is addressed. The multivariable characteristics of the control problem are addressed. The failure detection/identification problem is discussed as a multi-hypothesis testing problem. Control strategy reconfiguration, static multivariable controls, static failure hypothesis testing, dynamic multivariable controls, fault-tolerant control theory, dynamic hypothesis testing, generalized likelihood ratio (GLR) methods, and adaptive control are discussed. Author

N83-33898*# Honeywell Systems and Research Center, Minneapolis, Minn.
ROBUST RECONFIGURATION FOR HIGH RELIABILITY AND SURVIVABILITY FOR ADVANCED AIRCRAFT
Thomas B. Cunningham *In* NASA. Langley Research Center Restructurable Controls Aug. 1983 p 43-80 (For primary document see N83-33896 22-08)
Avail: NTIS HC A09/MF A01 CSCL 01C

Flight control system (FCS) reliability is discussed in terms of sensors, computers and actuators. The servo/actuation bottleneck is discussed. FCS survivability is considered. Preliminary survivability issues. A Grumman study vehicle, R-14, and YF-16 aircraft configurations are studied. Goals of control are reviewed. N.W.

N83-33899*# Kansas Univ., Lawrence.
RESTRUCTURABLE CONTROLS PROBLEM DEFINITION AND FUTURE RESEARCH
David R. Downing *In* NASA. Langley Research Center Restructurable Controls Aug. 1983 p 81-98 (For primary document see N83-33896 22-08)
Avail: NTIS HC A09/MF A01 CSCL 01C

Restructurable controls, failure classification, airframe design, failure type, control system type, post failure mission, plant identification, controller design techniques, and restructurable control concept validation tools are considered. Author

N83-33900*# Calspan Corp., Buffalo, N. Y.
EXPERIMENTAL EXPERIENCE AT CALSPAN
Edmund G. Ryanski *In* NASA. Langley Research Center Restructurable Controls Aug. 1983 p 99-114 (For primary document see N83-33896 22-08)
Avail: NTIS HC A09/MF A01 CSCL 01C

A partial list of controllers; multiple means of generating forces and moments available; control power requirements; new aircraft design vs existing configuration; critical technology areas; parameter identification; and types of failure or emergency for reconfiguration are considered. N.W.

N83-33901*# Joint Inst. for Acoustics and Flight Sciences, Hampton, Va.
A REVIEW OF SYSTEM IDENTIFICATION METHODS APPLIED TO AIRCRAFT
Vladislav Klein *In* NASA. Langley Research Center Restructurable Controls Aug. 1983 p 115-132 refs (For primary document see N83-33896 22-08)
Avail: NTIS HC A09/MF A01 CSCL 01C

Airplane identification, equation error method, maximum likelihood method, parameter estimation in frequency domain, extended Kalman filter, aircraft equations of motion, aerodynamic model equations, criteria for the selection of a parsimonious model, and online aircraft identification are addressed. Author

N83-33902*# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
SELF-REPAIRING DIGITAL FLIGHT CONTROL SYSTEM
Duane P. Rubertus *In* NASA. Langley Research Center Restructurable Controls Aug. 1983 p 133-160 refs (For primary document see N83-33896 22-08)
Avail: NTIS HC A09/MF A01 CSCL 01C

Self-repairing digital flight control systems and aircraft battle damage repair are addressed. Author

N83-33903*# ALPHATECH, Inc., Burlington, Mass.
STATE-OF-THE-ART THEORY APPLICATION
Sol Gully *In* NASA. Langley Research Center Restructurable Controls Aug. 1983 p 161-174 (For primary document see N83-33896 22-08)
Avail: NTIS HC A09/MF A01 CSCL 01C

Nonlinear failure detection and isolation (FDI), robust FDI, coordinate controller, detector, estimator, and isolator, AI/modern systems theory, sensor fusion, and man-machine interaction are addressed. Author

N83-33904*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
NASA/FAA EXPERIMENTS CONCERNING HELICOPTER IFR AIRWORTHINESS CRITERIA
J. V. Lebacqz Jul. 1983 20 p refs
(NASA-TM-84388; A-9440; NAS 1.15:84388) Avail: NTIS HC A02/MF A01 CSCL 01C

A sequence of ground and flight simulation experiments was

conducted as part of a joint NASA/FAA program to investigate helicopter instrument flight rules (IFR) airworthiness criteria. The first six of these experiments are described and the results summarized. Five of the experiments were conducted on large amplitude motion base simulators; V/STOLAND UH-1H variable stability helicopter was used in the flight experiment. Airworthiness implications of selected variables that were investigated across all of the experiments are discussed, including the level of longitudinal static stability, the type of stability and control augmentation, the addition of flight director displays, and the type of instrument approach task. Among the specific results reviewed are the adequacy of neutral longitudinal statics for dual pilot approaches and the requirement for pitch and roll attitude stabilization in the stability and control augmentation system to achieve flying qualities evaluated as satisfactory. S.L.

N83-33905# Kuhn (Richard E.), Newport News, Va.
ON THE PREDICTION OF THE LATERAL/DIRECTIONAL CHARACTERISTICS OF DISTRIBUTED JET STOL CONFIGURATIONS Final Report
Richard E. Kuhn Dec. 1982 96 p refs
(Contract N62269-82-C-0220; WF41400000)
(AD-A128902; NADC-81275-60) Avail: NTIS HC A05/MF A01 CSCL 01/1

A method for estimating the lateral/directional stability characteristics of jet flap STOL transport configurations at high power-on lift coefficients is presented. In addition to inducing a large stabilizing sidewash at the vertical tail powered lift reduces the directional instability contribution of the wing/body, increases the wing body side force and tends to reduce (depending on the amount of geometric dihedral incorporated) the high level of effective dihedral normally associated with swept wings at high lift coefficients. Author (GRA)

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N83-33906*# Fluidyne Engineering Corp., Minneapolis, Minn.
PRELIMINARY ENGINEERING STUDY QUICK OPENING VALVE MSFC HIGH REYNOLDS NUMBER WIND TUNNEL (STUDY REPORT APPENDICES) Final Report
Jul. 1983 101 p
(Contract NAS8-35056; FluiDyne Proj. 1380)
(NASA-CR-170849; NAS 1.26:170849) Avail: NTIS HC A06/MF A01 CSCL 14B

Release mechanism concept, seal concepts, vendor contacts, and calculations are discussed. N.W.

N83-33907*# National Aeronautics and Space Administration, Washington, D. C.
DEVELOPMENT OF A PROCESS CONTROL COMPUTER DEVICE FOR THE ADAPTATION OF FLEXIBLE WIND TUNNEL WALLS
Jurgen Barg Sep. 1982 56 p refs Transl. into ENGLISH of "Entwicklung einer ProzeBrechnergesteuerten Regleinrichtung fur die Adaptation von Flexiblen Windkanalwanden" rept. ILR-Mitt-70 Inst. fur Luft-und Raumfahrt, Technische Univ., Berlin, Jul. 1980 p 1-51 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76979; NAS 1.15:76979; ILR-Mitt-70) Avail: NTIS HC A04/MF A01 CSCL 14B

In wind tunnel tests, the problems arise of determining the wall pressure distribution, calculating the wall contour, and controlling adjustment of the walls. This report shows how these problems have been solved for the high speed wind tunnel of the Technical University of Berlin. Author

N83-33908*# National Aeronautics and Space Administration, Washington, D. C.
WALL INTERFERENCE CORRECTION IMPROVEMENTS FOR THE ONERA MAIN WIND TUNNELS
Xavier Vaucheret Aug. 1982 24 p refs Transl. into ENGLISH of conf. paper presented at the 50th Fluid Dyn. Panel Spec. Meeting on Wall Interference in Wind Tunnels, 1982 p 1-12 Meeting held in London, 19-20 May 1982 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76971; NAS 1.15:76971) Avail: NTIS HC A02/MF A01 CSCL 14B

This paper describes improved methods of calculating wall interference corrections for the ONERA large windtunnels. The mathematical description of the model and its sting support have become more sophisticated. An increasing number of singularities is used until an agreement between theoretical and experimental signatures of the model and sting on the walls of the closed test section is obtained. The singularity decentering effects are calculated when the model reaches large angles of attack. The porosity factor cartography on the perforated walls deduced from the measured signatures now replaces the reference tests previously carried out in larger tunnels. The porosity factors obtained from the blockage terms (signatures at zero lift) and from the lift terms are in good agreement. In each case (model + sting + test section), wall corrections are now determined, before the tests, as a function of the fundamental parameters M, CS, CZ. During the windtunnel tests, the corrections are quickly computed from these functions. Author

N83-33909*# National Aeronautics and Space Administration, Washington, D. C.
THE EFFECTS OF SUPPORTS ON THE FLOW BEHIND A BODY
P. Rebuffet May 1983 47 p refs Transl. into ENGLISH of conf. paper presented at the La Reunion sur les Effets des Interactions en Soufflerie du Groupe de Trail, 1959 p 1-31 Conf. held in Rhode St. Genese, Belgium, 2-5 Mar. 1959 Original document was announced as N80-71569 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-77073; NAS 1.15:77073) Avail: NTIS HC A03/MF A01 CSCL 14B

Two cases in a supersonic flow with a turbulent boundary layer are studied in order to determine the effects of supports on models with a flat base. The first concerns the effect of various obstacles situated upstream of the two dimensional base, at Mach 2. The second relates to a body of revolution passing through the throat of the jet from upstream to downstream. The interference of obstacles simulating supporting masts is examined for the base, both bare and with a sting, at Mach 1.94. Without any support, the drag of a conical-cylindrical body of revolution was measured by means of the ONERA magnetic suspension. The interference of various stings was studied at Mach 2.4 with a laminary boundary layer and with a separated turbulent boundary layer. The mechanism of the interference of a sting, progressively approached axially to the base, was determined. Author

N83-33910*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A RADIO-FREQUENCY ANALYSIS OF PARABOLOIDAL ANTENNAS LOCATED NEAR DIFFRACTING FENCES
R. F. Schmidt Mar. 1983 47 p refs
(NASA-TM-84996; NAS 1.15:84996) Avail: NTIS HC A03/MF A01 CSCL 20N

The cylindrical waves associated with the Sommerfeld solution for a diffracting half-plane are applied in the evaluation of the effects of secondary radiation on the focal-region-fields of paraboloids. A cross-correlation between the computed focal-region-fields and the feed-antenna-fields is then introduced to

determine the modified radiation pattern of paraboloidal antennas. The half-plane solution is adapted to estimate the effects of a polygonal fence on 9-meter S-band and 3-meter S- and Ku-band antennas at the Merrit Island, Fl Spacecraft Tracking and Data Network Station. Author

N83-33911*# National Academy of Sciences - National Research Council, Washington, D. C.
INFLUENCE OF COMPUTATIONAL FLUID DYNAMICS ON EXPERIMENTAL AEROSPACE FACILITIES: A FIFTEEN YEAR PROJECTION Final Report
Mar. 1983 128 p refs Sponsored in part by AEDC
(Contract NASw-3455)
(NASA-CR-172859; NAS 1.26:172859; PB83-191312) Avail: NTIS HC A07/MF A01 CSCL 14B

An assessment was made of the impact of developments in computational fluid dynamics (CFD) on the traditional role of aerospace ground test facilities over the next fifteen years. With improvements in CFD and more powerful scientific computers projected over this period it is expected to have the capability to compute the flow over a complete aircraft at a unit cost three orders of magnitude lower than presently possible. Over the same period improvements in ground test facilities will progress by application of computational techniques including CFD to data acquisition, facility operational efficiency, and simulation of the light envelope; however, no dramatic change in unit cost is expected as greater efficiency will be countered by higher energy and labor costs. GRA

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N83-33912* National Aeronautics and Space Administration, Washington, D. C.
TECHNOLOGY FOR LARGE SPACE SYSTEMS, A BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 8
Feb. 1983 115 p
(NASA-CP-7046(08); NAS 1.55:7046(08)) Avail: NTIS HC $13.00 CSCL 22A

This bibliography lists 414 reports, articles and other documents introduced into the NASA scientific and technical information system. It provides helpful information to the researcher, manager, and designer in technology development and mission design in the area of Large Space System Technology. Subject matter is grouped according to systems, interactive analysis and design, structural and thermal analysis and design, structural concepts and control systems, electronics, advanced materials, assembly concepts, propulsion, and solar power satellite systems. S.L.

N83-33913*# Houston Univ., Tex.
NSTA-NASA SHUTTLE STUDENT INVOLVEMENT PROJECT. EXPERIMENT RESULTS: INSECT FLIGHT OBSERVATION AT ZERO GRAVITY Final Report
Todd E. Nelson and James R. Peterson (Honeywell, Inc.) 20 Sep. 1982 68 p
(NASA-CR-173028; NAS 1.26:173028) Avail: NTIS HC A04/MF A01 CSCL 22A

The flight responses of common houseflies, velvetbean caterpillar moths, and worker honeybees were observed and filmed for a period of about 25 minutes in a zero-g environment during the third flight of the Space Shuttle Vehicle (flight number STS-3; March 22-30, 1982). Twelve fly puparia, 24 adult moths, 24 moth pupae, and 14 adult bees were loaded into an insect flight box, which was then stowed aboard the Shuttle Orbiter, the night before the STS-3 launch at NASA's Kennedy Space Center (KSC). The main purpose of the experiment was to observe and compare the flight responses of the three species of insects, which have somewhat different flight control mechanisms, under zero-g conditions. B.W.

N83-33914*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE MARSHALL SPACE FLIGHT CENTER KC-135 ZERO GRAVITY TEST PROGRAM FOR FY 1982
R. E. Shurney, ed. May 1983 90 p refs
(NASA-TM-82541; NAS 1.15:82541) Avail: NTIS HC A05/MF A01 CSCL 22A

During FY-82, researchers and experimenters from Marshall Space Flight Center (MSFC) conducted 11 separate investigations during 26.3 hr of testing aboard the KC-135 zero-gravity aircraft, based at Ellington Air force Base, Texas. Although this represented fewer hours than initially projected, all experiment and test objectives were met or exceeded. This Technical Memorandum compiles all results achieved by MSFC users during FY-82, a year considered to be highly productive. B.W.

N83-33915*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SPACELAB MISSION 1 EXPERIMENT DESCRIPTIONS, THIRD EDITION
Paul D. Craven, ed. Aug. 1983 159 p
(NASA-TM-82537; NAS 1.15:82537; ESA/FSLP-EX-001) Avail: NTIS HC A08/MF A01 CSCL 22A

Experiments and facilities selected for flight on the first Spacelab mission are described. Chosen from responses to the Announcement of Opportunity for the Spacelab 1 mission, the experiments cover five broad areas of investigation: atmospheric physics and Earth observations; space plasma physics; astronomy and solar physics; material sciences and technology; and life sciences. The name of the principal investigator and country is listed for each experiment. A.R.H.

N83-33916*# National Academy of Sciences - National Research Council, Washington, D. C. Aeronautics and Space Engineering Board.
NASA'S SPACE RESEARCH AND TECHNOLOGY PROGRAM. REPORT OF A WORKSHOP Final Report
1983 129 p refs
(Contract NASw-3455)
(NASA-CR-173065; NAS 1.26:173065) Avail: NTIS HC A07/MF A01; also available from Aeronautics and Space Engineering Board, National Research Council, 2101 Constitution Ave., N.W., Washington, D.C. 20418 CSCL 22A

The status of the spacecraft and subsystem industry and the civil and military uses of space were examined. Genetic and specific enabling technologies were identified. It was found that U.S. spacecraft manufacturers support civil and commercial uses, the military and NASA and, in turn, are supported by subsystem suppliers. However, no single spacecraft program carries sufficient resources to develop advanced critical subsystem technologies and increasingly, U.S. suppliers are facing strong competition from foreign industry that is government subsidized. Author

N83-33917# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SPACE ENERGETICS
Afudu Yefusiji 7 Apr. 1983 11 p Transl. into ENGLISH from Hangkong Zhishi (China), 1982 p 4-5
(AD-A128238; FTD-ID(RS)T-0206-83) Avail: NTIS HC A02/MF A01 CSCL 22/2

Advantages and disadvantages of a space power plant, a new concept of space power engineering, and laser carrier rocket propulsion, are discussed. N.W.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N83-33918*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COSPAS-SARSAT SATELLITE ORBIT PREDICTOR, VOLUME 2

Morton L. Friedman and James Bill Garrett (United States Air Force, Scott AFB, Belleville, Ill.) Sep. 1983 64 p
(NASA-TM-85015; NAS 1.15:85015) Avail: NTIS HC A04/MF A01 CSCL 22C

An analog aid is presented for determining the relationship between the SARSAT or COSPAS satellite orbit coverage of emergency locator transmitter/emergency position indicator radio beacon distress incidence. The predictor allows the user to quickly visualize the probability of a selected position being detected and is composed of a base map and a satellite track overlay for each satellite. A table of equator crossings for each satellite is included. Directions are given for using the predictor. Author

N83-33919# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN INVESTIGATION OF SPIN-ORBIT RESONANCE ABOUT A SEMI-SYNCHRONOUS NEAR POLAR ORBIT M.S. Thesis
Robert Ian Boren Dec. 1982 65 p refs
(AD-A124794; AFIT/GSO/AA/82D-1) Avail: NTIS HC A04/MF A01 CSCL 22/3

An investigation of the spin-orbit resonance effects for a semi-synchronous near polar orbit was undertaken in order to determine whether consideration of all resonance terms associated with a particular commensurability ratio would result in the existence of multiple equilibrium points for placement of satellites utilizing this type of orbit. The Hamiltonian of the geopotential in Delaunay elements using first and second order zonal harmonic terms was first transformed to a set of modified variables. The effects of the resonant disturbing function were then developed and the resultant Hamiltonian, valid for near polar inclinations and small eccentricities, was reduced to a single degree of freedom through a second transformation. Phase portraits of the system Hamiltonian were then generated and an analysis of the resonance structure and librational periods performed. A single equilibrium point for each resonance term was discovered. Because of the physical meaning of the critical argument, the stable equilibrium points for both the first and second resonance terms appear to be candidates for deployment of future satellite systems. The semi-analytic technique of phase potraits was shown to be a feasibile approach to the investigation of resonance effects. GRA

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

No abstracts in this category.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N83-33920# Committee on Science and Technology (U. S. House).
UNITED STATES CIVILIAN SPACE PROGRAMS. VOLUME 2: APPLICATIONS SATELLITES
Marcia S. Smith, Jane Bortnick, Barbara A. Luxenberg, Lani H. Raleigh, Thomas K. McKnight, and John Reichhardt Washington GPO 1983 401 p refs Presented to the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 98th Congr., 1st Sess., May 1983 Prepared by the Library of Congr., Congr. Res. Serv.
(GPO-20-255) Avail: Subcommittee on Space Science and Applications

Accomplished in the area of applications satellites (communications, meteorology, Earth resources and environmental monitoring, ocean sensing, geodynamics, navigation, and tracking and data replay) since the inception of our space program are reviewed. Several significant issues for consideration are identified. S.L.

N83-33921*# Computer Sciences Corp., El Segundo, Calif.
MULTISATELLITE ATTITUDE DETERMINATION/OPTICAL ASPECT BIAS DETERMINATION (MSAD/OABIAS) SYSTEM DESCRIPTION AND OPERATING GUIDE. VOLUME 1: INTRODUCTION AND ANALYSIS
M. Joseph, J. E. Ket, K. S. Liu, M. E. Plett, M. A. Shear, T. Shinohara, and J. R. Wertz [1983] 195 p 4 Vol.
(Contract NAS5-11999)
(NASA-CR-173020; NAS 1.26:173020; CSC/TR-75-6001-Vol-1) Avail: NTIS HC A09/MF A01 CSCL 22A

The Multisatellite Attitude Determination/Optical Aspect Bias Determination (MSAD/OABIAS) System, designed to determine spin axis orientation and biases in the alignment or performance of optical or infrared horizon sensors and Sun sensors used for spacecraft attitude determination is described. MSAD/OABIAS uses any combination of eight observation models to process data from a single onboard horizon sensor and Sun sensor to determine simultaneously the two components of the attitude of the spacecraft, the initial phase of the Sun sensor, the spin rate, seven sensor biases, and the orbital in-track error associated with the spacecraft ephemeris information supplied to the system. In addition, the MSAD/OABIAS System provides a data simulator for system and performance testing, an independent deterministic attitude system for preprocessing and independent testing of biases determined, and a multipurpose data prediction and comparison system. Author

N83-33922*# Computer Sciences Corp., El Segundo, Calif.
MULTISATELLITE ATTITUDE DETERMINATION/OPTICAL ASPECT BIAS DETERMINATION (MSAD/OABIAS) SYSTEM DESCRIPTION AND OPERATING GUIDE. VOLUME 3: OPERATING GUIDE
M. Joseph, J. Keat, K. S. Liu, M. E. Plett, M. A. Shear, T. Shinohara, and J. R. Wertz [1983] 186 p 4 Vol.
(Contract NAS5-11999)
(NASA-CR-173017; NAS 1.26:173017; CSC/TR-75/6001-Vol-3) Avail: NTIS HC A09/MF A01 CSCL 22A

The Multisatellite Attitude Determination/Optical Aspect Bias Determination (MSAD/OABIAS) System, designed to determine spin axis orientation and biases in the alignment or performance of optical or infrared horizon sensors and Sun sensors used for spacecraft attitude determination, is described. MSAD/OABIAS uses any combination of eight observation models to process data from a single onboard horizon sensor and Sun sensor to determine simultaneously the two components of the attitude of the spacecraft, the initial phase of the Sun sensor, the spin rate, seven sensor biases, and the orbital in-track error associated with the spacecraft ephemeris information supplied to the system. In addition, the MSAD/OABIAS system provides a data simulator for system and performance testing, an independent deterministic attitude system for preprocessing and independent testing of biases determined, and a multipurpose data prediction and comparison system. Author

N83-33923*# Computer Sciences Corp., El Segundo, Calif.
EVALUATION OF THE COMMUNICATIONS TECHNOLOGY SATELLITE ATTITUDE ACQUISITION ALGORITHMS AND PROCEDURES Final Report
G. M. Lerner, J. E. Keat, J. S. Legg, Jr., K. Yong, and B. T. Blaylock [1983] 250 p
(Contract NAS5-11999)
(NASA-CR-173019; NAS 1.26:173019; CSC/TM-76/6003) Avail: NTIS HC A11/MF A01 CSCL 22A

The results of the study of the Communications Technology Satellite (CTS) attitude acquisition procedures are described.

Models of spacecraft hardware and dynamics are also included.
Author

N83-33924# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Ocean Science and Technology Lab.
GEOSAT-A OCEAN APPLICATIONS PROGRAM (GOAP) INITIAL DATA PROCESSING AND ANALYSIS SYSTEM TEST AND EVALUATION PLAN
Matthew Lybanon Mar. 1983 18 p
(AD-A126784; NORDA-TN-158) Avail: NTIS HC A02/MF A01 CSCL 09/2

An operational demonstration as part of the GEOSAT-A Ocean Applications Program (GOAP) is presented. It is shown that oceanographic products can be derived from altimeter data in near real time. The information processing system that will be used for this task and plans for its development and testing are described. Plans for the system operation, personnel assignments and training, evaluation of the products, and eventual transfer of the operations to FNOC are outlined. GRA

N83-33925# MATRA Espace, Paris-Velizy (France).
STANDARD GENERIC APPROACH FOR SPACECRAFT INTELLIGENCE AND AUTOMATION. PHASE 1, VOLUME 1: EXECUTIVE SUMMARY Final Report
G. Berger, J. Cornet, M. Cellier, L. Riou, J. Sotta, and M. Thibaut Paris ESA 1983 45 p 2 Vol.
(Contract ESTEC-4869/81/NL-PP)
(DM55/JPS/JP/317-83-Vol-1; ESA-CR(P)-1759-Vol-1) Avail: NTIS HC A03/MF A01

Applications of onboard autonomy and data processing, and the corresponding spacecraft and ground control organization were identified by analyzing the Viking 75 deep space mission and the ERS-1 (ESA satellite) Earth observation mission. Telecommunication satellites, STS, data relay satellites and large space stations were also studied. An approach to spacecraft intelligence and autonomy based on a hierarchical, decentralized system structure, in order to limit failure propagation, simplify interfaces, and improve performance predictability, is proposed. Onboard management is subdivided into routine, crisis, and end product management. Orbit determination and control is autonomous.
Author (ESA)

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N83-33926*# Systems Dynamics, Inc., Gainesville, Fla.
SPACE SHUTTLE PROPULSION PARAMETER ESTIMATION USING OPTIMAL ESTIMATION TECHNIQUES Monthly Progress Report
20 May 1983 51 p refs
(NASA-CR-170842; NAS 1.26:170842; MPR-1) Avail: NTIS HC A04/MF A01 CSCL 22B

The first twelve system state variables are presented with the necessary mathematical developments for incorporating them into the filter/smoother algorithm. Other state variables, i.e., aerodynamic coefficients can be easily incorporated into the estimation algorithm, representing uncertain parameters, but for initial checkout purposes are treated as known quantities. An approach for incorporating the NASA propulsion predictive model results into the optimal estimation algorithm was identified. This approach utilizes numerical derivatives and nominal predictions within the algorithm with global iterations of the algorithm. The iterative process is terminated when the quality of the estimates provided no longer significantly improves. Author

N83-33927*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
COLUMBIA: THE FIRST FIVE FLIGHTS ENTRY HEATING DATA SERIES. VOLUME 2: THE OMS POD Final Report
S. D. Williams Jul. 1983 800 p refs
(Contract NAS9-15800)
(NASA-CR-171657; NAS 1.26:171657; LEMSCO-19346-Vol-2) Avail: NTIS HC A99/MF A01 CSCL 22B

Entry heating flight data and wind tunnel data on the OMS Pod are presented for the first five flights of the Space Shuttle Orbiter. The heating rate data are presented in terms of normalized film heat transfer coefficients as a function of angle-of-attack, Mach number, and normal shock Reynolds number. The surface heating rates and temperatures were obtained via the JSC NONLIN/INVERSE computer program. Time history plots of the surface heating rates and temperatures are also presented. Author

N83-33928*# Intermetrics, Inc., Huntsville, Ala.
PDSS CONFIGURATION CONTROL PLAN AND PROCEDURES
1 Jan. 1983 34 p
(Contract NAS8-33825)
(NASA-CR-170850; NAS 1.26:170850; IR-AL-003) Avail: NTIS HC A03/MF A01 CSCL 22A

The payload development support system (PDSS) configuration control plan and procedures are presented. These plans and procedures establish the process for maintaining configuration control of the PDSS system, especially the Spacelab experiment interface device's (SEID) RAU, HRM, and PDI interface simulations and the PDSS ECOS DEP Services simulation. The plans and procedures as specified are designed to provide a simplified but complete configuration control process. The intent is to require a minimum amount of paperwork but provide total traceability of PDSS during experiment test activities. S.L.

N83-33929*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-7) LAUNCH
D. L. Johnson, C. K. Hill, and G. W. Batts (Computer Sciences Corp., Huntsville, Ala.) Jul. 1983 49 p refs
(NASA-TM-82542; NAS 1.15:82542) Avail: NTIS HC A03/MF A01 CSCL 22B

Selected atmospheric conditions observed near Space Shuttle STS-7 launch time on June 18, 1983, at Kennedy Space Center, Florida are summarized. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of prelaunch Jimsphere measured vertical wind profiles is given in this report. Also presented are wind and thermodynamic parameters representative of surface and aloft conditions in the SRB descent/impact ocean area. Final meteorological tapes, which consist of wind and thermodynamic parameters versus altitude, for STS-7 vehicle ascent and Acoustic/SRB descent have been constructed. The STS-7 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 936-53-22-368 with Johnson Space Center. Author

N83-33930# ARO, Inc., Arnold Air Force Station, Tenn.
SPACE SHUTTLE INTEGRATED VEHICLE AERODYNAMIC INTERFERENCE HEATING TEST (NASA JSC TEST IH-97) Final Report, Aug. - Dec. 1982
William K. Crain and Kenneth W. Nutt AEDC Dec. 1982 71 p refs
(AD-A128063; AEDC-TSR-82-V37) Avail: NTIS HC A04/MF A01 CSCL 20/4

Wind tunnel tests were conducted on the 0.0175 scale 60-OTS Integrated Space Shuttle Vehicle in the von Karman Gas Dynamics Facility Tunnel A. The objectives were to obtain heating data in locations where developmental flight instrumentation (DFI) had been placed on the full scale vehicle and to obtain validation data for the aeroheating design methodology. Data were obtained over the Mach range of 2.25 to 4.00 at free stream unit Reynolds numbers of 3.7 x 10.6 to 5.7 x 10.6 per foot. Model attitude was varied over the range +5 to -5 degrees angle of attack and +6 to -6 degrees angle of side slip. GRA

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N83-33931# California Univ., Berkeley. Lawrence Berkeley Lab.
WIDEBAND PRECISION ANALOG TELEMETRY LINK USING DIGITAL TECHNIQUES
William E. Hearn Oct. 1982 4 p refs Presented at the IEEE Nucl. Sci. Symp., Washington, D.C., 20 Oct. 1982
(Contract DE-AC03-76SF-00098)
(DE83-005459; LBL-14454; CONF-821011-43) Avail: NTIS HC A02/MF A01

A highly linear Wideband Analog Fiber Optic Link is described which samples at a 1 MHz rate with 10-bit accuracy and transmits and receives by means of a high speed PDM code. Aliasing and sampling effects are fully suppressed and a nearly Gaussian pulse response is attained with a 2 micro sec risetime. Analog signals are recovered with very low distortion and d.c. drift and a S/N ratio of better than 52 db. DOE

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-33932*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
ON IDENTIFIABILITY OF FLEXIBLE STRUCTURE PARAMETERS Final Report, period ending 5 Jul. 1983
S. M. Joshi and G. L. Goglia Jul. 1983 15 p
(Grant NAG1-102)
(NASA-CR-173049; NAS 1.26:173049) Avail: NTIS HC A02/MF A01 CSCL 22B

This report investigates the identifiability of modal parameters of flexible structures. Expressions are derived for Cramer-Rao lower bounds for the modal parameters, that is, frequencies, damping ratios and mode shapes or slopes. The optimal initial state, which maximizes the trace of the Fisher information matrix in the absence of persistent input, is obtained. The concepts discussed are applied to a finite-element model of the 122 meter hoop/column antenna. The numerical results show that the identifiability of the structural frequencies is excellent, followed by that of the damping ratios and the mode-slopes. Author

N83-33933*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ORBITAL THERMAL ANALYSIS OF LATTICE STRUCTURED SPACECRAFT USING COLOR VIDEO DISPLAY TECHNIQUES
Robert L. Wright, Dariene D. DeRyder, and Michael T. Palmer Jun. 1983 20 p refs Original contains color illustrations
(NASA-TM-85640; NAS 1.15:85640) Avail: NTIS HC A02/MF A01 CSCL 22B

A color video display technique is demonstrated as a tool for rapid determination of thermal problems during the preliminary design of complex space systems. A thermal analysis is presented for the lattice-structured Earth Observation Satellite (EOS) spacecraft at 32 points in a baseline non Sun-synchronous (60 deg inclination) orbit. Large temperature variations (on the order of 150 K) were observed on the majority of the members. A gradual decrease in temperature was observed as the spacecraft traversed the Earth's shadow, followed by a sudden rise in temperature (100 K) as the spacecraft exited the shadow. Heating rate and temperature histories of selected members and color graphic displays of temperatures on the spacecraft are presented. Author

N83-33934# MATRA Espace, Paris-Velizy (France). Espace Produits et Technologies.
SYSTEM FEASIBILITY STUDY ON RENDEZVOUS AND DOCKING IN TRANSFER ORBIT Final Report
B. Govin, A. Ayoun, M. Cougnet, M. Caldichoury, M. Chillot, and P. Lebouar Paris ESA 14 Feb. 1983 237 p refs
(Contract ESA-4883/81)
(Rept-0032/VT070; ESA-CR(P)-1746) Avail: NTIS HC A11/MF A01

A feasible systems concept, required technology and problem areas for autonomous rendezvous and docking (RVD) are identified. The selected model mission is the RVD of a payload module and a propulsion module in transfer orbit to geostationary orbit (GTO). The launch strategy is analyzed in order to select the chaser and target orbits and to define the achievable masses. A system concept definition of payload and propulsion module is established. Detailed strategies, schemes and procedures for acquisition, homing and final approach are analyzed. Safety requirements and involvement of the ground station are investigated. The basic requirements for the RVD equipment (guidance instrumentation, attitude sensing, propulsion equipment, telematic equipment) are established; according to these requirements, candidate equipment concepts and technologies are identified and selected. Design requirements for the docking phase are given and feasible concepts identified. Applicability of identified strategies and instrumentation for RVD in GTO and low Earth orbit is examined. Author (ESA)

N83-33935# Aerospace Engineering Office, Zurich (Switzerland).
EVALUATION OF FLECS MODAL DATA Final Report
K. J. Zimmermann, M. Foletta, and Y. Deger Paris ESA 29 Oct. 1982 133 p refs
(Contract ESTEC-4459/80/NL-AK(SC))
(Rept-29.1-136/NT; ESA-CR(P)-1752) Avail: NTIS HC A07/MF A01

The modal data of a dummy structure designed to dynamically represent a typical communication satellite are analyzed to physically update an existing finite element model of that structure. The dynamic characteristics are presented by two sets of real mode parameters, one obtained by test, the other by analysis, containing 30 modes and 133 dynamic degrees of freedom. The adaptation was performed semiautomatically by applying differential sensitivity algorithms. Using single-parameter changes to correct the stiffness of the finite element model improvements are achieved after a few iteration steps. Applying a multiparameter method, one iteration step is sufficient to reduce the frequency deviations of 21 modes to less than 10% and 14 modes to less than 5%. The presented approach and software allow the correlation and adaptation of a spacecraft mathematical model in one man-week at computer cost of the same order of magnitude. Author (ESA)

N83-33936# Erno Raumfahrttechnik G.m.b.H., Bremen (West Germany).
MODSCIT: MODULAR DESIGN OF SPACECRAFT RELATED TO COST OF INTEGRATION AND TESTS. VOLUME 1: EXECUTIVE SUMMARY Final Report
Paris ESA Dec. 1982 39 p 2 Vol.
(Contract ESTEC-4912/81/NL-PP(SC))
(ESA-CR(P)-1755-Vol-1) Avail: NTIS HC A03/MF A01

The findings in key areas of the technical study are summarized including the overall design guidelines, reference configurations, subsystem design requirements and trends, reviewing of the verification methods, facility requirements, ground support equipment and cost comparison. Author (ESA)

N83-33937# Erno Raumfahrttechnik G.m.b.H., Bremen (West Germany).
MODSCIT: MODULAR DESIGN OF SPACECRAFT RELATED TO COST OF INTEGRATION AND TESTS. VOLUME 2: TECHNICAL VOLUME Final Report

M. Baune, J. vonBloh, R. Brandt, H. J. Guenther, B. Nagwany, B. Schwarz, and B. Sultan Paris ESA Dec. 1982 208 p refs 2 Vol.
(Contract ESTEC-4912/81/NL-PP(SC))
(ESA-CR(P)-1755-Vol-2) Avail: NTIS HC A10/MF A01

Modular design of spacecraft was analyzed to produce comments and recommendations in key areas such as overall design guidelines, reference configurations, subsystem design requirements and trends, reviewing of the verification methods, facility requirements, ground support equipment and cost comparison. The reference missions which were used for the study are the Low Orbit Earth Observation mission and the Geosynchronous Telecommunication mission. A model philosophy proposed is to use a structure model for structure qualification and verification of mechanical environment, an engineering model for functional system verification and thermal qualification and thermal environment verification. The flight unit is only subjected to functional acceptance. Author (ESA)

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-33938*# System Dynamics, Inc., Gainesville, Fla.
SPACE SHUTTLE PROPULSION PARAMETER ESTIMATION USING OPTIONAL ESTIMATION TECHNIQUES Monthly Progress Report
20 Jul. 1983 69 p refs
(Contract NAS8-35324)
(NASA-CR-170847; NAS 1.26:170847; MPR-3) Avail: NTIS HC A04/MF A01 CSCL 21H

A regression analyses on tabular aerodynamic data provided. A representative aerodynamic model for coefficient estimation. It also reduced the storage requirements for the 'normal' model used to check out the estimation algorithms. The results of the regression analyses are presented. The computer routines for the filter portion of the estimation algorithm and the :'bringing-up' of the SRB predictive program on the computer was developed. For the filter program, approximately 54 routines were developed. The routines were highly subsegmented to facilitate overlaying program segments within the partitioned storage space on the computer. S.L.

N83-33939*# TRW Defense and Space Systems Group, Redondo Beach, Calif.
SPACE POWER DISTRIBUTION SYSTEM TECHNOLOGY. VOLUME 1: REFERENCE EPS DESIGN Final Report
D. Kent Decker, Marshall D. Cannady, John E. Cassinelli, Bertrand F. Farber, Charles Lurie, Gerald W. Fleck, Jack W. Lepisto, Alan Massner, and Paul F. Ritterman Mar. 1983 287 p refs 2 Vol.
(Contract NAS8-33198)
(NASA-CR-170852; NAS 1.26:170852;
TRW-34579-6001-UT-00-Vol-1) Avail: NTIS HC A13/MF A01 CSCL 22B

The multihundred kilowatt electrical power aspects of a mannable space platform in low Earth orbit is analyzed from a cost and technology viewpoint. At the projected orbital altitudes, Shuttle launch and servicing are technically and economically viable. Power generation is specified as photovoltaic consistent with projected planning. The cost models and trades are based upon a zero interest rate (the government taxes concurrently as required), constant dollars (1980), and costs derived in the first half of 1980. Space platform utilization of up to 30 years is evaluated to fully understand the impact of resupply and replacement as satellite missions are extended. Such lifetimes are potentially realizable with Shuttle servicing capability and are economically desirable. S.L.

N83-33940*# TRW Defense and Space Systems Group, Redondo Beach, Calif.
SPACE POWER DISTRIBUTION SYSTEM TECHNOLOGY. VOLUME 2: AUTONOMOUS POWER MANAGEMENT Final Report
D. Kent Decker, Marshall D. Cannady, John E. Cassinelli, Bertrand F. Farber, Charles Lurie, Gerald W. Fleck, Jack W. Lepisto, Alan Messner, and Paul F. Ritterman Mar. 1983 199 p refs 2 Vol.
(Contract NAS8-33198)
(NASA-CR-170853; NAS 1.26:170853;
TRW-34579-6001-UT-00-Vol-2) Avail: NTIS HC A09/MF A01 CSCL 22B

Electrical power subsystem requirements, power management system functional requirements, algorithms, power management subsystem, hardware development, and trade studies and analyses are discussed. Author

N83-33941*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ASSESSMENT OF FLYWHEEL ENERGY STORAGE FOR SPACECRAFT POWER SYSTEMS
G. Ernest Rodriguez, Philip A. Studer, and David A. Baer May 1983 53 p refs
(NASA-TM-85061; NAS 1.15:85061; G-83F0229) Avail: NTIS HC A04/MF A01 CSCL 22B

The feasibility of inertial energy storage in a spacecraft power system is evaluated on the basis of a conceptual integrated design that encompasses a composite rotor, magnetic suspension, and a permanent magnet (PM) motor/generator for a 3-kW orbital average payload at a bus distribution voltage of 250 volts dc. The conceptual design, which evolved at the Goddard Space Flight Center (GSFC), is referred to as a Mechanical Capacitor. The baseline power system configuration selected is a series system employing peak-power-tracking for a Low Earth-Orbiting application. Power processing, required in the motor/generator, provides a potential alternative configurations that can only be achieved in systems with electrochemical energy storage by the addition of power processing components. One such alternative configuration provides for peak-power-tracking of the solar array and still maintains a regulated bus, without the expense of additional power processing components. Precise speed control of the two counter-rotating wheels is required to reduce interaction with the attitude control system (ACS) or alternatively, used to perform attitude control functions. Critical technologies identified are those pertaining to the energy storage element and are prioritized as composite wheel development, magnetic suspension, motor/generator, containment, and momentum control. Comparison with a 3-kW, 250-Vdc power system using either NiCd or NiH2 for energy storage results in a system in which inertial energy storage offers potential advantages in lifetime, operating temperature, voltage regulation, energy density, charge control, and overall system weight reduction. B.W.

N83-33942*# TRW, Inc., Redondo Beach, Calif. Space and Technology Group.
ELECTROTHERMAL THRUSTER DIAGNOSTICS. VOLUME 1: EXECUTIVE SUMMARY
S. Zafran and B. Jackson May 1983 12 p refs 2 Vol.
(Contract NAS3-23265)
(NASA-CR-168174-Vol-1; NAS 1.26:168174-Vol-1;
TRW-39152-6011-UE-00-Vol-1) Avail: NTIS HC A02/MF A01 CSCL 21H

A flight-qualified electrothermal thruster demonstrated its adaptability to a variety of propellants. Originally qualified for operation with hydrazine propellant, it was operated with nitrogen, hydrogen, and ammonia propellants, demonstrating 73, 61, and 52 percent overall efficiency with these propellants, respectively, when tested over a wide range of operating conditions. By introducing a preheater to admit hot, rather than cold, propellant inlet gases to the thruster's augmentation heat exchanger, delivered specific impulse closer to theoretical performance limits should be achieved. Author

N83-33943*# TRW, Inc., Redondo Beach, Calif. Space and Technology Group.
ELECTROTHERMAL THRUSTER DIAGNOSTICS. VOLUME 2: TECHNICAL
S. Zafran and B. Jackson May 1983 57 p refs 2 Vol.
(Contract NAS3-23265)
(NASA-CR-168174-Vol-2; NAS 1.26:168174-Vol-2; TRW-39152-6012-UE-00-Vol-2) Avail: NTIS HC A04/MF A01 CSCL 21H

Test data taken with nitrogen, hydrogen, and ammonia propellants are presented over a wide range of operating conditions at thrust levels up to 225 mN (50 mlb). The design adaptation of a flight-qualified thruster for operation with gaseous propellant inlet is described. Post-test analysis includes evaluation of thruster performance and efficiency, and shows the effects of propellant contamination on an immersed heating element. Author

N83-33944# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
RESEARCH OF THE PROJECT FOR ADJUSTING THE THRUST OF A SOLID ROCKET PROPULSOR
Xu Wengan 2 Mar. 1983 16 p refs Transl. into ENGLISH from Yuhang Xuebao (China), no. 1, 1981 p 84-91
(AD-A128094; FTD-ID(RS)T-0056-83) Avail: NTIS HC A02/MF A01 CSCL 21/8

A plan for a solid rocket motor with adjustable propellant is discussed. It was realized through the use of a negative pressure exponent propellant. The feasibility and characteristics of the adjustment of this technique were discussed. The other advantages of the negative pressure exponent propellant are pointed out. R.J.F.

N83-33945# California Univ., Livermore. Lawrence Livermore Lab.
RESULTS OBTAINED DURING ACOUSTIC EMISSION MONITORING OF PROOF TESTING OF A LARGE KEVLAR/EPOXY ROCKET MOTOR CASE
M. A. Hamstad 1 Dec. 1982 41 p refs Presented at the 1st Intern. Symp. on Acoustic Emission from Composites, San Francisco, 1 Jul. 1983
(Contract W-7405-eng-48)
(DE83-011275; UCRL-88272; CONF-830755-1) Avail: NTIS HC A03/MF A01

A total of 15 acoustic emission (AE) sensors were used to monitor a large Kevlar 49/epoxy rocket motor case during proof cycles to successively higher levels. Fourteen of the sensors were placed on the composite surface and one sensor was coupled to a stainless steel waveguide which penetrated the full length of the inside of the hydraulically pressurized motor case. To reduce signal propagation losses, the bandpass was chosen to be 5 to 10 kHz. The AE data obtained by hand post-processing of event listings generated for each proof cycle during the test are discussed. Real AE signal propagation losses are compared to the losses from Pentel pencil-lead breaks. Data indicated that a certain area of the composite case is the potential region of failure. DOE

N83-33946# MATRA Service Aerodynamique, Toulouse (France).
DEFINITION OF STANDARD SPACECRAFT POWER INTERFACE CHARACTERISTICS Final Report
C. Viallet and P. Ranzoli Paris ESA Feb. 1983 163 p refs
(Contract ESA-4505/80/NL-PP(SC))
(DM.54/CV/JP/0318.83; ESA-CR(P)-1749) Avail: NTIS HC A08/MF A01

European power bus standards are reviewed. The constraints and requirements of power interfaces are identified and candidates for a standard are selected. The concept of a modular power interfaces compatible with different input voltages is introduced to give the flexibility required for application to a maximum of projects. Mass and parts counts for each solution applied to a typical set of equipment are estimated. The selected modular approach is compatible with dc unregulated, dc regulated, and ac voltages. Standard input voltages are defined, and the compatibility with the majority of European spacecrafts which use a 50 V dc regulated voltage and with the majority of US designs is demonstrated. A mass penalty at equipment level is compensated by a mass gain at system level. Author (ESA)

N83-34837# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
PROPULSION SYSTEMS: STUDY OF AEROTHERMODYNAMIC PROCESSES, AND EVALUATION OF PROPULSION COMPONENTS AND PROPULSION SYSTEMS [ANTRIEBSSYSTEME: AERO-THERMODYNAMISCHE PROZESS- UND BEWERTUNGSSTUDIE VON ANTRIEBSKOMPONENTEN UND -SYSTEMEN]
Peter A. Kramer *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 484-533 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N83-33947# Foreign Resources Associates, Fort Collins, Colo.
PROCESS FOR PRODUCING AROMATIC CARBONYL COMPOUNDS
Takeshi Inoi and Takehiko Okamoto Jan. 1983 7 p Transl. into ENGLISH from Japanese Patent No. Sho-44-9892 (1969) Prepared for Rockwell International Corp., Golden, Colo.
(Contract DE-AC04-76DP-03533)
(DE83-005659; RFP-Trans-351) Avail: NTIS HC A02/MF A01

A process is claimed for simultaneously producing aromatic carbonyl compounds such as alpha phenyl-propionaldehyde and methyl benzyl ketone done by: (1) treating alpha methylstyrenes with halogens or halogenating agents in an acidic solution, or (2) first reacting the halogens or halogenating agents with the alpha methylstyrenes then hydrolyzing the products with an acidic aqueous solution. DOE

N83-33948# Environmental Protection Agency, Washington, D.C. Office of Pesticides and Toxic Substances.
EPA CHEMICAL ACTIVITIES, THIRD EDITION. VOLUME 1: INDEXES Status Report
Eleanor T. Merrick, comp. Jun. 1982 404 p
(PB83-181917; EPA-560/TIIS-82-002A-Vol-1) Avail: NTIS HC A18/MF A01 CSCL 13B

Names and synonyms for chemicals included in a pesticide and toxic substances data base are listed. GRA

N83-33949# Environmental Protection Agency, Washington, D.C. Office of Pesticides and Toxic Substances.
EPA CHEMICAL ACTIVITIES, THIRD EDITION, VOLUME 2 Status Report
Eleanor T. Merrick, comp. Jun. 1982 412 p
(PB83-181925; EPA-560/TIIS-82-002B-Vol-2) Avail: NTIS HC A18/MF A01 CSCL 13B

Brief descriptions of chemical-specific regulations, guidelines and studies of the Environmental Protection Agency (EPA) are given. Together, the reports permit users to identify chemicals of interest to EPA, and describe EPA activities related to those chemicals. GRA

24 COMPOSITE MATERIALS

Includes laminates.

N83-33950* National Aeronautics and Space Administration. Pasadena Office, Calif.
MIXED POLYVALENT-MONOVALENT METAL COATING FOR CARBON-GRAPHITE FIBERS Patent
Jan Harper-Tervet (JPL, California Inst. of Tech., Pasadena), Fred W. Tervet (JPL, California Inst. of Tech., Pasadena), and Marshall F. Humphrey, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 16 Nov. 1982 5 p Filed 30 Jun. 1980
(NASA-Case-NPO-14987-1; US-Patent-4, 359,503; US-Patent-Appl-SN-164-584; US-Patent-Class-428-367; US-Patent-Class-427-215; US-Patent-Class-427-241; US-Patent-Class-428-375; US-Patent-Class-428-392; US-Patent-Class-428-902; US-Patent-Class-428-903) Avail: US Patent and Trademark Office CSCL 11D

An improved coating of gasification catalyst for carbon-graphite fibers is provided comprising a mixture of a polyvalent metal such as calcium and a monovalent metal such as lithium. The addition of lithium provides a lighter coating and a more flexible coating when applied to a coating of a carboxyl containing resin such as polyacrylic acid since it reduces the crosslink density. Furthermore, the presence of lithium provides a glass-like substance during combustion which holds the fiber together resulting in slow, even combustion with much reduced evolution of conductive fragments. The coated fibers are utilized as fiber reinforcement for composites. Official Gazette of the U.S. Patent and Trademark Office

N83-33951 Clemson Univ., S.C.
ANALYSIS OF A HYBRID, UNI-DIRECTIONAL LAMINATE WITH DAMAGE Ph.D. Thesis
Lokeswarappa R. Dharani 1982 52 p
Avail: Univ. Microfilms Order No. DA8300096

The development of a method of analysis capable of predicting accurately the fracture behavior of unidirectional hybrid (buffer strip) composite laminates is considered. Three particular solutions are discussed in detail: first the case of broken fibers in a unidirectional half-plane; secondly the case of adjointed half planes of different fiber and matrix properties; and finally the solution of two half planes bounding a third distinct region of finite width. The finite width region represents a buffer strip and primary attention is given to the potential of this strip to arrest a crack that originates in one of the half planes. The analysis is based on a materials modeling approach using the classical shear lag assumption to describe the stress transfer between fibers. Explicit fiber and matrix properties of the three regions are retained and changes in the laminate behavior as a function of the relative material properties, buffer strip width and initial crack length are discussed.
Dissert. Abstr.

N83-33952 Royal Aircraft Establishment, Farnborough (England).
THE COMPRESSIVE STRENGTH OF CARBON FIBER REINFORCED PLASTICS
K. F. Port 16 Aug. 1982 51 p refs
(RAE-TR-82083; RAE-Mat/Struct-2; BR86701) Copyright. Avail: Issuing Activity

Test specimens for the measurement of compressive strength of unidirectional CFRPs are discussed. While the RAE design is close to the optimum, tests demonstrate that the standard specimen measures a buckling strength. A modified specimen which measures a representative compressive strength of the material is suggested. This value is shown to be attainable in the 0 deg plies of multidirectional laminates. It is shown that compressive failure of unidetectional material involves fiber microbuckling and that a shear failure is not attainable even at -70C. The compressive stress-strain response of unidirectional CFRP is nonlinear, due to elastic fiber microinstability, initiated by initial fiber waviness. Experiments show that the compressive strength of multidirectional CFRP does not obey a rule of mixtures when more than 30% 0 deg plies are present, so the compressive strengths of such laminates cannot be calculated from the properties of the constituent plies. Author (ESA)

N83-33953*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Chemistry.
SURFACE ANALYSIS IN COMPOSITE BONDING Final Technical Report
D. L. Messick and J. P. Wightman Jul. 1983 23 p refs
(Contract NAG1-248)
(NASA-CR-173021; NAS 1.26:173021) Avail: NTIS HC A02/MF A01 CSCL 11D

X ray photoelectron spectroscopy and contact angle measurements on graphite fiber composites pretreated in a number of different ways including mechanical, chemical, and light irradiation were analyzed. Data acquired on surface contamination as a result of fabrication techniques provides answers to the strength and durability of adhesively bonded composites. These techniques were shown to provide valuable information on surface analysis of pretreated composites prior to adhesive bonding and following lap shear fracture. Author

N83-33954*# National Aeronautics and Space Administration, Washington, D. C.
FRACTURE MECHANICS IN FIBER REINFORCED COMPOSITE MATERIALS, TAKING AS EXAMPLES B/A1 AND CRFP
P. W. M. Peters Nov. 1982 5 p refs Transl. into ENGLISH of conf. paper presented at the Colloq. on Composite Mater., West Germany, 1980 2 p Conf. held in Cologne, 3 Dec. 1980 Original language document was announced as N82-14290 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76988; NAS 1.15:76988) Avail: NTIS HC A02/MF A01 CSCL 11D

The validity of linear elastic fracture mechanics and other fracture criteria was investigated with laminates of boron fiber reinforced aluminum (R/A1) and of carbon fiber reinforced epoxide (CFRP). Cracks are assessed by fracture strength Kc or Kmax (critical or maximum value of the stress intensity factor). The Whitney and Nuismer point stress criterion and average stress criterion often show that Kmax of fiber composite materials increases with increasing crack length; however, for R/A1 and CFRP the curve showing fracture strength as a function of crack length is only applicable in a small domain. For R/A1, the reason is clearly the extension of the plastic zone (or the damage zone n the case of CFRP) which cannot be described with a stress intensity factor. Author

N83-33955*# Sikorsky Aircraft, Stratford, Conn.
DESIGN, FABRICATION, INSTALLATION AND FLIGHT SERVICE EVALUATION OF A COMPOSITE CARGO RAMP SKIN ON A MODEL CH-53 HELICOPTER Report, Jun. 1976 - Dec. 1982
D. W. Lowry and M. J. Rich Apr. 1983 34 p refs
(Contract NAS1-14447)
(NASA-CR-172126; NAS 1.26:172126; SER-510111) Avail: NTIS HC A03/MF A01 CSCL 11D

The installation of a composite skin panel on the cargo ramp of a CH-530 marine helicopter is discussed. The composite material is of Kevlar/Epoxy (K/E) which replaces aluminum outer skins on the aft two bays of the ramp. The cargo ramp aft region was selected as being a helicopter airframe surface subjected to possible significant field damage and would permit an evaluation of the long term durability of the composite skin panel. A structural analysis was performed and the skin shears determined. Single lap joints of K/E riveted to aluminum were statically tested. The joint tests were used to determine bearing allowables and the required K/E skin gage. The K/E skin panels riveted to aluminum edge members were tested in a shear fixture to confirm the allowable shear and bearing strengths. Impact tests were conducted on aluminum skin panels to determine energy level and damage relationship. The K/E skin panels of various ply orientations and laminate thicknesses were then impacted at similar energy levels. The results of the analysis and tests were used to determine the

required K/E skin gages in each of the end two bays of the ramp. S.L.

N83-33956*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXPERIMENTAL AND ANALYTICAL INVESTIGATION OF THE FRACTURE PROCESSES OF BORON/ALUMINUM LAMINATES CONTAINING NOTCHES
W. S. Johnson, C. A. Bigelow, and Y. A. Bahei-El-Din (Cairo Univ.) Sep. 1983 44 p refs
(NASA-TP-2187; L-15574; NAS 1.60:2187) Avail: NTIS HC A03/MF A01 CSCL 11D

Experimental results for five laminate orientations of boron/aluminum composites containing either circular holes or crack-like slits are presented. Specimen stress-strain behavior, stress at first fiber failure, and ultimate strength were determined. Radiographs were used to monitor the fracture process. The specimens were analyzed with a three-dimensional elastic-elastic finite-element model. The first fiber failures in notched specimens with laminate orientation occurred at or very near the specimen ultimate strength. For notched unidirectional specimens, the first fiber failure occurred at approximately one-half of the specimen ultimate strength. Acoustic emission events correlated with fiber breaks in unidirectional composites, but did not for other laminates. Circular holes and crack-like slits of the same characteristic length were found to produce approximately the same strength reduction. The predicted stress-strain responses and stress at first fiber failure compared very well with test data for laminates containing 0 deg fibers. Author

N83-33957*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FAILURE ANALYSIS AND MECHANISMS OF FAILURE OF FIBROUS COMPOSITE STRUCTURES
Ahmed K. Noor, comp. (George Washington Univ.), Mark J. Shuart, comp., James H. Starnes, Jr., comp., and Jerry G. Williams, comp. Aug. 1983 382 p refs Workshop held in Hampton, Va., 23-25 Mar. 1982
(NASA-CP-2278; L-15641; NAS 1.55:2278) Avail: NTIS HC A17/MF A01 CSCL 11D

The state of the art of failure analysis and current design practices, especially as applied to the use of fibrous composite materials in aircraft structures is discussed. Deficiencies in these technologies are identified, as are directions for future research. For individual titles, see N83-33958 through N83-33969.

N83-33958*# Boeing Commercial Airplane Co., Seattle, Wash.
COMMERCIAL TRANSPORT AIRCRAFT COMPOSITE STRUCTURES
John E. McCarty *In* NASA. Langley Research Center Failure Anal. and Mech. of Failure of Fibrous Composite Struct. Aug. 1983 p 7-66 refs (For primary document see N83-33957 22-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The role that analysis plays in the development, production, and substantiation of aircraft structures is discussed. The types, elements, and applications of failure that are used and needed; the current application of analysis methods to commercial aircraft advanced composite structures, along with a projection of future needs; and some personal thoughts on analysis development goals and the elements of an approach to analysis development are discussed. R.J.F.

N83-33959*# General Dynamics Corp., Fort Worth, Tex.
A PRELIMINARY DAMAGE TOLERANCE METHODOLOGY FOR COMPOSITE STRUCTURES
D. J. Wilkins *In* NASA. Langley Research Center Failure Anal. and Mech. of Failure of Fibrous Composite Struct. Aug. 1983 p 67-94 refs (For primary document see N83-33957 22-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The certification experience for the primary, safety-of-flight composite structure applications on the F-16 is discussed. The rationale for the selection of delamination as the major issue for damage tolerance is discussed, as well as the modeling approach selected. The development of the necessary coupon-level data base is briefly summarized. The major emphasis is on the description of a full-scale fatigue test where delamination growth was obtained to demonstrate the validity of the selected approach. A summary is used to review the generic features of the methodology. R.J.F.

N83-33960*# McDonnell Aircraft Co., St. Louis, Mo.
DESIGN AND ANALYSIS OF COMPOSITE STRUCTURES WITH STRESS CONCENTRATIONS
S. P. Garbo *In* NASA. Langley Research Center Failure Anal. and Mech. of Failure of Fibrous Composite Struct. Aug. 1983 p 95-128 refs (For primary document see N83-33957 22-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

An overview of an analytic procedure which can be used to provide comprehensive stress and strength analysis of composite structures with stress concentrations is given. The methodology provides designer/analysts with a user-oriented procedure which, within acceptable engineering accuracy, accounts for the effects of a wide range of application design variables. The procedure permits the strength of arbitrary laminate constructions under general bearing/bypass load conditions to be predicted with only unnotched unidirectional strength and stiffness input data required. Included is a brief discussion of the relevancy of this analysis to the design of primary aircraft structure; an overview of the analytic procedure with theory/test correlations; and an example of the use and interaction of this strength analysis relative to the design of high-load transfer bolted composite joints. R.J.F.

N83-33961*# Army Research and Technology Labs., Fort Eustis, Va. Applied Technology Lab.
SAFE-LIFE AND DAMAGE-TOLERANT DESIGN APPROACHES FOR HELICOPTER STRUCTURES
Harold K. Reddick, Jr. *In* NASA. Langley Research Center Failure Anal. and Mech. of Failure of Fibrous Composite Struct. Aug. 1983 p 129-152 refs (For primary document see N83-33957 22-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The safe-life and damage-tolerant design approaches discussed apply to both metallic and fibrous composite helicopter structures. The application of these design approaches to fibrous composite structures is emphasized. Safe-life and damage-tolerant criteria are applied to all helicopter flight critical components, which are generally categorized as: dynamic components with a main and tail rotor system, which includes blades, hub and rotating controls, and drive train which includes transmission, and main and interconnecting rotor shafts; and the airframe, composed of the fuselage, aerodynamic surfaces, and landing gear. R.J.F.

N83-33962*# Washington Univ., St. Louis, Mo.
FAILURE MECHANISMS
H. Thomas Hahn *In* NASA. Langley Research Center Failure Anal. and Mech. of Failure of Fibrous Composite Struct. Aug. 1983 p 153-172 (For primary document see N83-33957 22-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

Data, charts, and graphs relating to longitudinal tension, crack growth modes in unidirectional composites, strength predictions, and compression are given. R.J.F.

N83-33963*# California Univ., Livermore. Lawrence Livermore Lab.
STRENGTH THEORIES OF COMPOSITES: STATUS AND ISSUES
Edward M. Wu *In* NASA. Langley Research Center Failure Anal. and Mech. of Failure of Fibrous Composite Struct. Aug. 1983 p 173-190 (For primary document see N83-33957 22-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The longitudinal strength of fibrous composites is studied. A probability model for the strength of fibrous materials is described. Failure modes are observed. Author

N83-33964*# Lockheed Missiles and Space Co., Palo Alto, Calif.
ANALYSIS OF DELAMINATION

Frank W. Crossman *In* NASA. Langley Research Center Failure Anal. and Mech. of Failure of Fibrous Composite Struct. Aug. 1983 p 191-240 refs (For primary document see N83-33957 22-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

This paper reviews our understanding of the influence of delamination on the fracture sequence and final fracture of graphite-epoxy laminates. The emphasis here is on tensile fracture. B.W.

N83-33965*# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
NOTCH STRENGTH OF COMPOSITES
James M. Whitney *In* NASA. Langley Research Center Failure Anal. and Mech. of Failure of Fibrous Composite Struct. Aug. 1983 p 241-264 refs (For primary document see N83-33957 22-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The notch strength of composites is discussed. The point stress and average stress criteria relate the notched strength of a laminate to the average strength of a relatively long tensile coupon. Tests of notched specimens in which microstrain gages have been placed at or near the edges of the holes have measured strains much larger that those measured in an unnotched tensile coupon. Orthotropic stress concentration analyses of failed notched laminates have also indicated that failure occurred at strains much larger than those experienced on tensile coupons with normal gage lengths. This suggests that the high strains at the edge of a hole can be related to the very short length of fiber subjected to these strains. Lockheed has attempted to correlate a series of tests of several laminates with holes ranging from 0.19 to 0.50 in. Although the average stress criterion correlated well with test results for hole sizes equal to or greater than 0.50 in., it overestimated the laminate strength in the range of hole sizes from 0.19 to 0.38 in. It thus appears that a theory is needed that is based on the mechanics of failure and is more generally applicable to the range of hole sizes and the varieties of laminates found in aircraft construction. B.W.

N83-33966*# Delaware Univ., Newark. Center for Composite Materials.
COMPRESSION FAILURE OF COMPOSITE LAMINATES
R. B. Pipes *In* NASA. Langley Research Center Failure Anal. and Mech. of Failure of Fibrous Composite Struct. Aug. 1983 p 265-292 (For primary document see N83-33957 22-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

This presentation attempts to characterize the compressive behavior of Hercules AS-1/3501-6 graphite-epoxy composite. The effect of varying specimen geometry on test results is examined. The transition region is determined between buckling and compressive failure. Failure modes are defined and analytical models to describe these modes are presented. B.W.

N83-33967*# Lockheed Missiles and Space Co., Palo Alto, Calif. Applied Mechanics Lab.
THE IN SITU TRANSVERSE LAMINA STRENGTH OF COMPOSITE LAMINATES
Donald L. Flaggs *In* NASA. Langley Research Center Failure Anal. and Mech. of Failure of Fibrous Composite Struct. Aug. 1983 p 293-304 refs (For primary document see N83-33957 22-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The objective of the work reported in this presentation is to determine the in situ transverse strength of a lamina within a composite laminate. From a fracture mechanics standpoint, in situ strength may be viewed as constrained cracking that has been shown to be a function of both lamina thickness and the stiffness of adjacent plies that serve to constrain the cracking process. From an engineering point of view, however, constrained cracking can be perceived as an apparent increase in lamina strength. With the growing need to design more highly loaded composite structures, the concept of in situ strength may prove to be a viable means of increasing the design allowables of current and future composite material systems. A simplified one dimensional analytical model is presented that is used to predict the strain at onset of transverse cracking. While it is accurate only for the most constrained cases, the model is important in that the predicted failure strain is seen to be a function of a lamina's thickness d and of the extensional stiffness bE theta of the adjacent laminae that constrain crack propagation in the 90 deg laminae. B.W.

N83-33968*# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Structural Integrity Branch.
EFFECTS OF DEFECTS IN COMPOSITE STRUCTURES
G. P. Sendeckyj *In* NASA. Langley Research Center Failure Anal. and Mech. of Failure of Fibrous Composite Struct. Aug. 1983 p 305-312 refs (For primary document see N83-33957 22-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

The effect of defects in composite structures is addressed. Defects in laminates such as wrinkles, foreign particles, scratches and breaks are discussed. Effects of plygap plywaviness and machining defects are also studied. B.W.

N83-33969*# Illinois Inst. of Tech., Chicago.
EXPERIMENTAL METHODS FOR IDENTIFYING FAILURE MECHANISMS
I. M. Daniel *In* NASA. Langley Research Center Failure Anal. and Mech. of Failure of Fibrous Composite Struct. Aug. 1983 p 313-341 refs (For primary document see N83-33957 22-24)
Avail: NTIS HC A17/MF A01 CSCL 11D

Experimental methods for identifying failure mechanisms in fibrous composites are studied. Methods to identify failure in composite materials includes interferometry, holography, fractography and ultrasonics. B.W.

N83-33970*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
TIME-DEPENDENT RESPONSE OF FILAMENTARY COMPOSITE SPHERICAL PRESSURE VESSELS
Jan D. Dozier Aug. 1983 130 p refs
(NASA-TM-82543; NAS 1.15:82543) Avail: NTIS HC A07/MF A01 CSCL 11D

A filamentary composite spherical pressure vessel is modeled as a pseudoisotropic (or transversely isotropic) composite shell, with the effects of the liner and fill tubes omitted. Equations of elasticity, macromechanical and micromechanical formulations, and laminate properties are derived for the application of an internally pressured spherical composite vessel. Viscoelastic properties for the composite matrix are used to characterize time-dependent behavior. Using the maximum strain theory of failure, burst pressure and critical strain equations are formulated, solved in the Laplace domain with an associated elastic solution, and inverted back into the time domain using the method of collocation. Viscoelastic properties of HBFR-55 resin are experimentally determined and a Kevlar/HBFR-55 system is evaluated with a FORTRAN program. The computed reduction in burst pressure with respect to time indicates that the analysis employed may be used to predict the time-dependent response of a filamentary composite spherical pressure vessel. Author

N83-33971*# Toronto Univ. (Ontario). Inst. for Aerospace Studies.
FAILURE ANALYSIS OF COMPOSITE LAMINATES INCLUDING BIAXIAL COMPRESSION Interim Report, Aug. 1980 - Aug. 1982
R. C. Tennyson and W. G. Elliott Aug. 1983 131 p refs
(Grant NsG-7409)
(NASA-CR-172192; NAS 1.26:172192) Avail: NTIS HC A07/MF A01 CSCL 11D

This report describes a continued effort on the development and application of the tensor polynomial failure criterion for composite laminate analysis. In particular, emphasis is given to the design, construction and testing of a cross-beam laminate configuration to obtain 'pure' biaxial compression failure. The purpose of this test case was to provide to permit 'closure' of the

cubic form of the failure surface in the 1-2 compression-compression quadrant. This resulted in a revised set of interaction strength parameters and the construction of a failure surface which can be used with confidence for strength predictions, assuming a plane stress state exists. Furthermore, the problem of complex conjugate roots which can occur in some failure regions is addressed and an 'engineering' interpretation is provided. Results are presented illustrating this behavior and the methodology for overcoming this problem is discussed. Author

N83-33972# Michigan State Univ., East Lansing. Dept. of Physics.
STRUCTURE AND VIBRATIONAL EXCITATIONS OF INTERCALATED GRAPHITE Final Report, 1 Mar. 1979 - 18 Nov. 1982
S. A. Solin 22 Mar. 1983 4 p refs
(Contracts DAAG29-79-C-0029; DAAG29-80-K-0003)
(AD-A126480; ARO-15903.3-PH; ARO-17641.6-PH; TR-25) Avail: NTIS HC A02/MF A01 CSCL 20/8

Neutron scattering methods were used to investigate the lattice dynamics of stage one Rb graphite. Intercalate (Rb) modes with polarization and wave vectors parallel to the basal plane were observed for the first time. The experimentally derived partial phonon density of states for intercalate modes is compared with model calculations. Phonon dispersion curves are measured for longitudinal c-axis modes and for some transverse modes propagating in the basal plane. GRA

N83-33973# Army Materials and Mechanics Research Center, Watertown, Mass. Metals Research Div.
TENSILE PROPERTY EVALUATION OF POLYCRYSTALLINE ALUMINA FILAMENTS AND THEIR COMPOSITES Final Report
John Nunes Dec. 1982 27 p refs
(DA Proj. 1L1-62105-AH-84)
(AD-A126482; AMMRC-TR-82-61) Avail: NTIS HC A03/MF A01 CSCL 11/4

The tensile properties of polycrystalline alumina filaments were measured and statistically evaluated for several different gage lengths (0.5, 1, 2, 3, 5, and 10 inches). A two parameter Weibull distribution function was used to describe the in situ filament failure stresses. A statistical failure mode analysis for composites was in agreement between theoretical predictions and published tensile strength data on cast Fiber FP/aluminum and Fiber FP/magnesium. GRA

N83-33974# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.
THERMAL CONDUCTIVITIES AND DIFFUSIVITIES OF GRAPHITE-EPOXY COMPOSITES Final Report, 2 Jan. - 31 Dec. 1982
Lit S. Han and William F. Boyee Wright-Patterson AFB, Ohio AFWAL Feb. 1983 87 p refs
(Contract F33615-79-C-3030; AF Proj. 2401)
(AD-A128744; AFWAL-TR-83-3002) Avail: NTIS HC A05/MF A01 CSCL 11/4

This report presents the results of a research program on rotating stall in axial flow compressors and jet engines. The program had three major objectives which were: (1) develop an analysis for a three-dimensional, time-variant rotating stall and separation theory, (2) develop analysis for post-stall operation/recovery and aerodynamically induced exotic metal combustion, and (3) consider the effects of distortion, water ingestion, and nuclear blasts on axial flow compressors. The work done towards accomplishing objective (1) is reported in Volume 1. The work done towards the accomplishment of the remaining two objectives is reported in Volume 2. Volume 1 contains the description of an implicit time marching Euler code, a small disturbance stability theory for the compressible flow through a compressor stage, and a three-dimensional unsteady lifting surface theory for annular blade rows. Author (GRA)

N83-33975# Sandia Labs., Albuquerque, N. Mex. Computational Physics and Mechanics.
A THEORY OF MULTIPHASE MIXTURES
Stephen L. Passman, Jace W. Nunziato, and E. K. Walsh (Florida Univ., Gainesville) Mar. 1983 78 p refs
(Contract DE-AC04-76DP-00789)
(DE83-012766; SAND-82-2261) Avail: NTIS HC A05/MF A01

Modeling porous or granular materials requires a more specific and complex mathematical structure than does modeling an ordinary continuum. An exact and self consistent model for mixtures of such materials is presented. The theory is in accord with all of the basic principles of continuum mechanics. Examples of constitutive models requiring such a substructure are given. GRA

N83-33976# Ecole Nationale Superieure des Telecommunications, Paris (France).
SHEAR DAMAGE IN UNIDIRECTIONAL COMPOSITE MATERIALS Ph.D. Thesis - Ecole Nationale Superieure d'Arts et Metiers and Paris 6 Univ.
J. Renard Feb. 1982 189 p refs In FRENCH; ENGLISH summary
(Rept-156) Avail: NTIS HC A09/MF A01

In order to investigate fiber-matrix interfacial bond failure and matrix crazing in fiber resin composites, unidirectional graphite/epoxy composites were studied under quasi-static shear loading. With a first group of intact specimens loaded up to different levels of twisting moment, a linear variation of the damage with respect to the moment exceeding the moment at the limit of elasticity is observed. Each specimen of another group was cycled between a zero moment and a given moment beyond the limit of elasticity. A geometrical progression of the damage with respect to the number of cycles and a limit of damage are observed. The ratio of the progression is not dependant on the maximum applied moment. A finite element analysis using a variation of the local elastic properties during the damage was performed to predict its propagation. Author (ESA)

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N83-33977* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SYNTHESIS OF DAWSONITES Patent
Robert L. Altman, inventor (to NASA) Issued 26 Oct. 1982 3 p Filed 14 Aug. 1980 Supersedes N80-31490 (18 - 22, p 2967)
(NASA-Case-ARC-11326-1; US-Patent-4, 356,157;
US-Patent-Appl-SN-178192; US-Patent-Class-423-419P;
US-Patent-Class-252-5; US-Patent-Class-423-600;
US-Patent-Class-424-156) Avail. US Patent and Trademark Office CSCL 07D

Alkali metal and ammonium dawsonites can be prepared by a nonaqueous process according to which equimolar quantities of the corresponding hydrogen carbonate and aluminum hydroxide in finely divided state are heated together to a tempeature within the range of 150 to 250 C, for a period of 1 to 6 hours under a carbon dioxide pressure within the range of 120 to 360 psig. Carbonates may be used instead of hydrogencarbonates.
Official Gazette of the U.S. Patent and Trademark Office

N83-33978*# Scientific Service, Inc., Huntsville, Ala.
IMPACT REACTIVITY OF MATERIALS AT VERY HIGH OXYGEN PRESSURE Final Report
H. W. Connor, J. G. Minchey, Roy Crowder, and Rod Davidson 19 May 1983 164 p refs
(Contract NAS8-35185)
(NASA-CR-170854; NAS 1.26:170854) Avail: NTIS HC A08/MF A01 CSCL 07D

The requirements for impact testing of materials in an oxygen

atmosphere at pressures from 82.7 MPa (12,000 psi) to 172 MPa (25,000 psi) were evaluated. The impact tester system was evaluated for potential pressure increases from 69 MPa (10, 000 psi) to 82.7 MPa (12,000 psi). The low pressure oxygen and nitrogen systems, the impact tower, the impact test cell, and the high pressure oxygen system were evaluated individually. Although the structural integrity of the impact test cell and the compressor were sufficient for operation at 82.7 MPa (12,000 psi), studies revealed possible material incompatibility at that pressure and above. It was recommended that if a component should be replaced for 82.7 MPa (12,000 psi) operation the replacement should meet the final objectives of 172 MPa (25,000 psi). Recommended changes in the system include; use of Monel 400 for pressures above 82.7 MPa (12,000 psi), use of bellows to replace the seal in the impact tester, use of a sapphire window attached to a fiber optic for event sensing, and use of a three diaphragm compressor. S.L.

N83-33979*# National Aeronautics and Space Administration, Washington, D. C.
ELECTROCHEMICAL INTERCALATION AND ELECTRICAL CONDUCTIVITY OF GRAPHITE FIBERS
J. O. Besenhard, H. P. Fritz, H. Moehwald, and J. J. Nickl Dec. 1982 8 p refs Transl. into ENGLISH from Z. fuer Naturfoschung, B: Anog. Chem., Org. Chem. (West Germany), v. 33B, no. 7, 1978 p 737-739 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-77008; NAS 1.15:77008) Avail: NTIS HC A02/MF A01 CSCL 07D

Lamellar compounds of graphite fibers were prepared by electrochemical intercalation. The dependence of the electrical resistance on the intercalate concentration was determined by a quasi simultaneous method. A factor 30 decrease of the relative fiber resistance was obtained with fluorosulfuric acid. Author

N83-33980*# National Aeronautics and Space Administration, Washington, D. C.
A METHOD FOR A SEPARATOR FOR CELLS
Tokuniro Takakaki and Yoshiko Tsujino Aug. 1982 11 p Transl. into ENGLISH of Japanese Patent no. 55-28392 (Appl. no. 48-43967, 16 Apr. 1973) p 143-146 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76945; NAS 1.15:76945) Avail: NTIS HC A02/MF A01 CSCL 07D

A method is presented for manufacturing a separator for cells which is characterized by the fact that the spaces or small holes in the porous body are made even smaller, and therefore the porous body is made physically stronger. Author

N83-33981# Purdue Univ., Lafayette, Ind. Dept. of Chemistry.
THE FREQUENCY FACTOR FOR OUTER-SPHERE ELECTROCHEMICAL REACTIONS
Joseph T. Hupp and Michael J. Weaver Feb. 1983 25 p refs Submitted for publication
(Contract N00014-83-K-0086)
(AD-A126722; TR-12) Avail: NTIS HC A02/MF A01 CSCL 07/4

The conventional formulation of the frequency factor A sub n (e) for outer-sphere electrochemical reactions based on a "collisional" model is compared with an alternative "encounter preequilibrium" treatment whereby A sub n is determined by the effective frequency of surmounting the free energy barrier within a previously assembled precursor state. The latter model is shown to provide a more appropriate description for electrochemical reactions under most conditions, in harmony with analogous considerations for homogeneous redox processes. Noticeably, (ca, 20 foid) larger values of A sub n (e) are derived from the encounter preequilibrium as compared to the collisional model, numerical relationships between the kinetics of corresponding electrochemical and homogeneous reaction and of competing inner and outer sphere electrochemical pathways that are significantly different from the conventional reactions are also predicted on the basis of the encounter preequilibrium model. GRA

N83-33982# Army Armament Research and Development Command, Dover, N. J. Large Weapons Lab.
CARS SPECTRA FROM LEAN AND STOICHIOMETRIC CH(4)-N(2)O FLAMES
L. E. Harris Mar. 1983 45 p
(AD-A126653; AD-E400987; ARLCD-TR-82026) Avail: NTIS HC A03/MF A01 CSCL 21/2

Broadband coherent anti-stokes raman scattering (CARS) spectra were obtained from both the reaction zone and post-flame region of lean and stoichiometric CH(4)-N(z)O flames. To assess methods of obtaining concentration from broadband spectra N(2) cars spectra were obtained from a series of air and argon (AIR/AR) mixtures at room temperature. The concentration of N(2) with good accuracy (6%) was obtained both from fitting the shape of the broadband spectra and from the ratio of the resonant to nonresonant susceptibility. Both methods were utilized in interpreting flame spectra. Author

N83-33983# Indiana Univ., Bloomington. Dept. of Physics.
METHANOL ADSORPTION AND DECOMPOSITION ON CLEAN AND OXIDIZED PALLADIUM (111) Interim Report
J. A. Gates and L. L. Kesmodel 25 Mar. 1983 29 p refs Submitted for publication
(Contract N00014-80-C-0147)
(AD-A126437; TR-6) Avail: NTIS HC A03/MF A01 CSCL 07/4

The interaction of methanol with Pd(111) was studied using high resolution electron energy loss spectroscopy (HREELS). A chemisorbed and a physisorbed phase on the surface at 140K was found. Desorption of the physisorbed phase occurs by 160K and approximately 90% of the chemisorbed layer desorbs by 300K. Exposure to methanol at 300K causes dissociation to chemisorbed CO. Decomposition of chemisorbed methanol to a methoxy species occurs near 200K in the presence of a preadsorbed p(2x2) oxygen layer whereas no methoxy is detected on the clean surface. Further dehydrogenation to CO is observed by 300K on the oxidized surface. Author

N83-33984# Purdue Univ., Lafayette, Ind. Lab. for Thermophysical Properties Research.
SPECIFIC HEAT OF OCTAHYDRO - 1,3,5,7 - TETRANITRO - 1,3,5,7 - TETRAZOCINE (HMX) Interim Scientific Report
L. G. Koshigoe, R. L. Shoemaker, and R. E. Taylor Jan. 1983 26 p refs
(Contract F49620-81-K-0011; AF Proj. 2308)
(AD-A128442; AFOSR-83-0373TR; TPRL-314) Avail: NTIS HC A03/MF A01 CSCL 19/1

The specific heat of octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) was studied with a Differential Scanning Calorimeter from 315-486 degrees K. Measurements were made on both small pieces of single crystals of HMX and on a powdered blend. In both cases, the specific heats of the beta and alpha phases, and also of partially decomposed HMX were determined. The results show that the specific heat values for the two phases are nearly the same. Differences in the specific heat values for the single crystals, powdered and partially decomposed samples are small, and all lie within a bond of 6%. The value for the single crystals are the lowest; for the powdered blend, intermediate and for the partially decomposed; highest. In the case of the single crystals versus the powder, the values are within the combined experimental error of 3%. Author (GRA)

N83-33985# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
KINETICS OF SILICON ELECTRODEPOSITION
J. M. Olson and Karen Carleton Sep. 1982 11 p refs Presented at the Sci. of Silicon Mater. Prepn. Workshop, Phoenix, Ariz., 23-25 Aug. 1982
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-002094; SERI/TP-212-1726; CONF-820879-1) Avail: NTIS HC A02/MF A01

After a brief overview of the process of electrorefining of silicon using a silicon permeable Si:Cu3Si anode, some of the theoretical aspects of electrochemical nucleation and growth kinetics are covered. Finally, results for the electrodeposition of silicon on carbon substrates are presented. It is shown that the rate of electrodeposition of silicon from a molten salt electrolyte is limited by a combination of mass transfer diffusion in the electrolyte phase; interfacial reaction kinetics, and, possibly, charge transfer kinetics. The initial stages of heterogeneous deposition are found to be characterized by the instantaneous nucleation of three dimensional model. DOE

N83-33986# Pacific Northwest Lab., Richland, Wash.
ANALYSIS AND COMPARISON OF PRODUCTS FROM WOOD LIQUEFACTION
Douglas C. Elliot Aug. 1982 25 p refs Presented at the Intern. conf. on Fundamentals of Thermochem. Biomass Conversion, Estes Park, Colo., 18 Oct. 1982
(Contract DE-AC06-76RL-01830)
(DE83-002047; PNL-SA-10293; CONF-821051-2) Avail: NTIS HC A02/MF A01

The results of the analtical effort dealing with the products from the Biomass Liquefaction Experimental Facility at Albany, Oregon are described. This facility produce approximately eighty barrels of wood derived oil in the period from August 1979 to March 1981. The oil was produced by two variations of the basis CO-Steam process. One variation involved recycle of a portion of the product so that a wood flour in oil slurry system was used. The other variation was a once through process wherein the wood was prehydrolyzed and then processed in a water slurry mode. both variations operated at about 340 C and 3000 psig with aqueous sodium carbonate as the catalyst and CO/H2 as the cover gas. Both processes were tested in a number of reactor configurations. The actual plant operation time is therefore broken into a number of test runs; products from runs 7 through 12 are discussed. DOE

N83-33987# Sandia Labs., Livermore, Calif.
OPTIMAL MEASUREMENTS OF SOOT FORMATION IN PREMIXED FLAMES
W. L. Flower Oct. 1982 28 p refs Presented at the Fall Meeting of the Western States Sect., Livermore, Calif., 11-12 Oct. 1982
(Contract DE-AC04-76DP-00789)
(DE83-002212; SAND-82-8812; CONF-821035-2) Avail: NTIS HC A03/MF A01

The growth of soot particles in rich premixed flames was measured using the diffusion broadening particle sizing technique. This dynamic light scattering technique eliminates the strong dependence of size measurement on particle complex index of refraction which is a problem with most light scattering size measurements. Size measurements were made in fuel rich premixed methane oxygen flat flames with fuel oxidizer ratios ranging from 2.2 to 2.9 times stoichiometric values and in propane oxygen flames at an equivalence ratio of 2.6. Particles as small as 23 nm in diameter were observed 5 mm above the burner surface (within about a millimeter of the flame front), growing to 60 to 120 nm (depending on the equivalence ratio) 14 nm above the burner. Measurements of the intensity of scattered light were used in conjunction with the size measurements to determine the soot number density in the methane oxygen flames, which was found to be decreasing with height above the burner at positions 5 mm above the burner and higher. DOE

N83-33988# California Univ., Livermore. Lawrence Livermore Lab.
PRODUCING THERMOCHEMICAL HYDROGEN WITH THE TANDEM-MIRROR REACTOR
Robert W. Werner and Robert G. Hickman 7 May 1982 8 p Presented at the 17th Intersoc. Energy Conversion Eng. Conf., Los Angeles, 8-13 Aug. 1982 Submitted for publication
(DE82-016776; UCRL-87592; CONF-820814-16) Avail: NTIS HC A02/MF A01

Fusion power holds the promise to supply not only electricity but also fuels to meet the balance of our energy needs. An integrated power and breeding blanket design is described for tandem mirror reactors. The blanket incorporates features that make it suitable for synthetic fuel production. In particular, it is matched to the thermal and electrical power requirements of the water-splitting process for production of hydrogen. Some improvements to the high temperature chemical process steps are described. DOE

N83-33989# Duke Univ., Durham, N. C. Dept. of Chemistry.
REACTION CALORIMETRY FOR COAL CHEMISTRY AND CATALYSIS Quarterly Reporting Period Report, 1 Aug. - 31 Oct. 1982
Edward M. Arnett 1982 13 p refs
(Contract DE-FG22-820C-50807)
(DE83-001773; DOE/PC-50807/1) Avail: NTIS HC A02/MF A01

Calorimetric equipment for performing high temperature thermochemistry (and kinetics) and for analyzing the reaction products is discussed. An important conclusion from studies is that heats of protonation for a series of bases, most of which are coal tar components, do not vary significantly between 25 deg and 200 C in the non-basic, non-acidic, nonaqueous solvent, Sulfolane. If this fact can be generalized it should make extrapolations of acid-base data from room temperatures to high temperatures much more dependable than is presently the case. Our proposed method for comparing acid base properties of solids with homogeneous analogues continues to be highly promising although the water content of the acid must be carefully controlled. DOE

N83-33990# Duquesne Univ., Pittsburgh, Pa. Dept. of Chemistry.
HYDROGEN BONDING IN ASPHALTENES AND COAL LIQUIDS Quarterly Report, 1 Aug. - 31 Oct. 1982
N. C. Li, L. Jones, N. F. Yaggi, and L. J. Young 1982 22 p refs Presented at the ACS Meeting, Kansas City, Sep. 1982 Submitted for publication
(Contract DE-AC22-80PC-30252)
(DE83-001044; DOE/PC-30252/T8; QR-9) Avail: NTIS HC A02/MF A01

Upgraded coal derived liquids obtained from catalystic hydroprocessing of SRC-II and H-coal syncrudes were studied by IR, PMR, GC/MS, and silica gel chromatography. With increase in residence time, nitrogen, oxygen, and aromatics decrease, accompanied by a large increase in naphthenes. Negligible hydrogen bonded material was found in the ungraded liquids. All the upgraded liquids show low viscosity at 298 K (1.3 to 1.4 mNs/sq.m), even though saturate and aromatic fractions varied with processing severity. In the aromatic-I fraction, 1-ring aromatics increase, and 3-ring aromatics decrease, wind an increase in severity of hydroprocessing. GC/MS analyses indicate a remarkable qualitative similarity for saturate and aromatic fractions irrespective of syncrude source. Only the heavier end of the aromatic-I fraction is noticeably different. DOE

N83-33991# Utah Univ., Salt Lake City. Dept. of Mining and Fuels Engineering.
CHEMISTRY AND CATALYSIS OF COAL LIQUEFACTION CATALYTIC AND THERMAL UPGRADING OF COAL LIQUID AND HYDROGENATION OF CO TO PRODUCE FUELS Quarterly Progress Report, Jan. - Mar. 1982
Wendell H. Wiser Jun. 1982 91 p refs
(Contract DE-AC22-79ET-14700)
(DE82-020554; DOE/ET-14700/10) Avail: NTIS HC A05/MF A01

Studies on Mo-supported catalysts showed that a high degree of dispersion of the Mo phase is associated with a specific interaction with alumina. Changes in catalytic activity for hydrogenation with different supports are explained by differences in the monolayer cluster size. When alumina is absent from the support, three dimensional MoS2 crystallites are formed, which exhibit lower catalytic activity. DOE

N83-33992# Alabama Univ., University. Dept. of Chemical and Metallurgical Engineering.
USE OF ALABAMA LIGNITE IN THE PRODUCTION OF LIGHTWEIGHT AGGREGATE
Leon Y. Sadler, III Oct. 1982 78 p refs
(DE83-901157; NP-3901157) Avail: NTIS HC A05/MF A01

Production of lightweight aggregate from Porter's Creek clay was chosen as a model process to be used in demonstrating the feasibility of using lignite fuel for rotary kiln mineral processing operations in or near the lignite belt. Pilot-scale rotary kiln testing and computer simulation of a commercial-scale operation using data from the pilot-scale tests demonstrated that lignite was a good fuel, requiring no auxiliary flame, for the processes provided the lignite fuel moisture content was less than about 20%. It was shown that hot kiln exhaust gases could be used to dry the raw lignite from about 50% moisture to 10% moisture, prior to lignite grinding and combustion, without the need for additional fuel for drying. Lignite could be delivered to the plant at a cost of 12.25/ton of lignite and would require an incremental investment of $128, 500 in mining equipment. DOE

N83-33993# Rockwell International Corp., Golden, Colo.
PROCESS FOR TREATING GASES CONTAINING POISONOUS COMPONENTS
K. Iwasa, T. Takada, M. Kiyama, and T. Akita Dec. 1982 9 p refs Transl. into ENGLISH from Japanese Patent no. 49-123174, 1974
(Contract DE-AC04-76DP-03533)
(DE83-005023; RFP-Trans-370) Avail: NTIS HC A02/MF A01

The poisonous gases containing at least one type of hydrocarbon together with nitrogen oxides and carbon monoxide are heat treated in a temperature range of 100 to 400 C in the presence of ferrite containing CO ions and having a spinel type crystal structure, so that the hydrocarbons and/or nitrogen oxides and carbon monoxide in the poisonous gases are converted to water and/or nitrogen and carbon dioxide. DOE

N83-33994# Foreign Resources Associates, Fort Collins, Colo.
PROCESS FOR REGENERATION OF DESULFURIZING AGENTS
Hisato Inaba and Kenji Yasuda Dec. 1982 8 p Transl. into ENGLISH of Japanese Patent no. Sho-49-17373 (1974)
(Contract DE-AC04-76DP-03533)
(DE83-005020; RFP-Trans-367) Avail: NTIS HC A02/MF A01

A manganese ferrite absorbent which has been used for desulfurization of sulfur containing gases is heated at 670 to 900 C in an inert gas or reducing gas atmosphere to eliminate the sulfur content from the absorbent and at the same time to regenerate manganese ferrite. DOE

N83-33995# Foreign Resources Associates, Fort Collins, Colo.
CATALYSTS FOR REMOVAL OF NITROGEN OXIDES
Takuro Kodera, Mihoru Kozasa, and Takashi Takano Jan. 1983 6 p Transl. into ENGLISH from Japanese Patent No. Sho-52-14592 (1977) Prepared for Rockwell International Corp., Golden, Colo.
(Contract DE-AC04-76DP-03533)
(DE83-005652; RFP-Trans-356) Avail: NTIS HC A02/MF A01

A catalyst is claimed for removing nitrogen oxides from waste gases discharged from electric power plants and chemical plants. The catalyst is a Mn-containing spinel-type ferrite which is bonded and solidified with a mixture of calcium aluminate or alumina and calcium oxide. Since the calcium aluminate support readily adsorbs sulfur dioxide, catalyst poisoning by sulfur dioxide is minimized, and catalytic activity can be maintained for a long period of time. Moreover, the catalyst can be produced without difficulty and is inexpensive. DOE

N83-33996# Department of Energy, Grand Forks, N. Dak. Energy Technology Center.
ANALYSIS OF LIGNITE LIQUEFACTION PRODUCTS PROCESSED WITH SYNGAS AND HYDROGEN SULFIDE
B. W. Farnum, S. A. Farnum, and E. F. Bitzan 1983 6 p refs Presented at 185th Am. Chem. Soc. Natl. Meeting, Seattle, 20 Mar. 1983
(DE83-001281; DOE/FC-1001; CONF-830303-1) Avail: NTIS HC A02/MF A01

A method for monitoring the presence of elemental and organic sulfur compounds in distillable low-rank coal liquefaction products utilizing column chromatography and dual detection (flame ionization detector/flame photometric detector) capillary gel column chromatography was developed. The addition of H2S to the continuous processing of Beulah, North Dakota lignite does not increase the amount or variety of sulfur-containing organic compounds in the recycle slurry ASTM-D1160 vacuum distillate products. It does, however, introduce sulfur and a variety of volatile sulfur-containing organics into the light oils condensed from the vapor phase in the reactor. The presence and variety of sulfur compounds after 12 to 14 reactor passes reflects the introduction of these components in the startup solvent. No increased mutagenicity was observed with the coal liquids processed with H2S. The production of H-donors in the recycle slurry ASTM D-1160 distillates was enhanced by the presence of H2S. DOE

N83-33997# Language Services, Nashville, Tenn.
MANUFACTURING PROCESS FOR A HIGH-TEMPERATURE ELECTROCHEMICAL ELEMENT
Tsvetko Chobanov, Dieter Kunze, and Friedrich Woeffler Mar. 1983 14 p Transl. into ENGLISH of French Patent no. 81-16496 (28 Aug. 1981) Prepared for Sandia National Labs., Albuquerque, N. Mex.
(Contract DE-AC04-76DP-00789)
(DE83-010255; SAND-83-6002) Avail: NTIS HC A02/MF A01

A process for the manufacture of a high temperature electrochemical element including a solid positive electrode, a solid negative electrode, a separator made of a finely dispersed ceramic type material set in the component parts of the element are described. DOE

N83-33998# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
NON-CONDENSIBLE GAS FRACTION PREDICTIONS USING WET AND DRY BULB TEMPERATURE MEASUREMENTS
J. Bowman and P. Griffith Mar. 1983 161 p refs
(DE83-901809; NUREG/CR-2853) Avail: NTIS HC A08/MF A01; also available from GPO $6.50

A technique is presented whereby noncondensible gas mass fractions in a closed system can be determined using wet bulb and dry bulb temperature and system pressure measurements. This technique has application in situations where sampling techniques can not be used. Using an energy balance about the wet bulb wick, and expression is obtained which relates the vapor concentration difference between the wet bulb wick and the free stream to the wet and dry bulb temperature difference and a heat to mass transfer coefficient ratio. This coefficient ratio was examined for forced and natural convection flows. This analysis was verified with forced and natural convection tests over the range of pressure and temperature from 50 to 557 psig and 415 to 576 F. All the data could best be fit by the natural convection analysis. This is useful when no information about the flow field is known. DOE

N83-33999# Sandia Labs., Albuquerque, N. Mex.
ROLE OF INSTRUMENTATION IN UCG PROCESS DEVELOPMENT
P. J. Hommert 1982 37 p refs Presented at Am. Inst. of Chem. Engr. Spring Meeting, Anaheim, Calif., 8 Jun. 1982
(Contract DE-AC04-76DP-00789)
(DE82-016397; SAND-81-2484C; CONF-820610-9) Avail: NTIS HC A03/MF A01

Underground coal gasification field test results obtained since 1976 are reviewed, illustrating the important role that the UCG process feature of a varying reactor geometry has on resource recovery and gas quality. The different instrumentation used on these tests is then reviewed, particularly as to its effectiveness, or lack of, in defining process geometry. Instrumentation such as thermocouples, HFEM, acoustic and surface resistivity are dis-

cussed with respect to concept, cost, resolution, data acquisition and data analysis. Results indicate that when instrumentation is appropriately deployed it can provide significant insight into the dynamics of reactor growth. DOE

N83-34000# Sheffield Univ. (England). Dept. of Control Engineering.
THE INFLUENCE OF HYDRAULIC DELAY ON THE COMPOSITION DYNAMICS AND CONTROLLER DESIGN OF TRAY-TYPE DISTILLATION COLUMNS
B. M. Zhou, H. M. Wang, and J. B. Edwards Jan. 1983 43 p refs
(RR-209) Avail: NTIS HC A03/MF A01

It is shown that although the hydraulic delay transfer function cannot be reformed into diagonal form, the dynamic behavior of all elements of this matrix are still very near to that of a first order lag. A set of controllers for this system is designed using the dyadic expansion method. The powerful interaction which exists between top and bottom products is reduced with the proper choice of controllers, and it is observed that even if the system without hydraulic delay has very high controller gain it can still keep stability while for the system with hydraulic delay only a very low gain can be employed if instability is to be avoided. Author (ESA)

N83-34001# Stockholm Univ. (Sweden). Arrhenius Lab.
AN AUTOMATED METHOD FOR THE DETERMINATION OF Na, K, Mg AND Ca USING ATOMIC ABSORPTION SPECTROSCOPY
Howard B. Ross 24 Jun. 1983 19 p refs
(Contracts SWEDSRC-G-GU-3922-105; SWED-EPB-531504-1)
(CM-63; ISSN-0280-445X) Avail: NTIS HC A02/MF A01

An automated method for the determination of Na, K, Mg and Ca with sensitivity of 0.005, 0.008, 0.003 and 0.015 mg/L respectively is described. The speed of the analyses is 30 sec/element. The instrument, the analytical procedures and the operation of the instrument are discussed. Author (ESA)

N83-34002# UOP, Inc., San Diego, Calif. Fluid Systems Div.
RESEARCH AND DEVELOPMENT ON SPIRAL-WOUND THIN-FILM COMPOSITE MEMBRANE SYSTEMS Final Report, 25 Aug. 1981 - 24 Aug. 1982
R. L. Riley and C. E. Milstead 17 Sep. 1982 133 p
(Contract DI-14-34-0001-1481)
(PB83-167825; OWRT-C-10062-D(1481)(1); W83-02052) Avail: NTIS HC A07/MF A01 CSCL 07A

Single stage desalination of seawater by reverse osmosis requires a membrane which approaches theoretical semipermeability and is sufficiently thin to provide transport of water at practical operating pressures and recovery rates. This objective was achieved by the development of a family of thin film composite membranes (TFC) based on nitrogen containing polymers supported on a fabric reinforced porous supporting membrane. Long term field testing of spiral wound was generally inconclusive since membrane damage due to the frequent presence of chlorine in the feed water precluded obtaining meaningful performance data. GRA

N83-34003# National Bureau of Standards, Washington, D.C.
PASSIVE FILMS, SURFACE STRUCTURE AND STRESS CORROSION AND CREVICE CORROSION SUSCEPTIBILITY
J. Kruger, J. J. Ritter, and G. G. Long Nov. 1982 73 p refs
(Contract NAONR-18-69)
(PB83-184202; NBSIR-83-2551) Avail: NTIS HC A04/MF A01 CSCL 07D

Transparent organic coatings on iron and steel are used to simulate painted metal surfaces for simultaneous ellipsometric and electrochemical measurements. The studies revealed that significant changes in the interfacial oxide layer occur as corrosion proceeds. The bonding, structure, and composition of passive films are still controversial subjects. A new surface X ray absorption technique, capable of probing a passive film on iron in its native aqueous environment was applied to this problem. GRA

N83-34004# California Univ., Santa Barbara. Dept. of Physics.
THEORETICAL RESEARCH ON SURFACE BONDING AND STRUCTURE Annual Report, 1 Jan. - 31 Dec. 1982
J. R. Schrieffer Jan. 1983 16 p Sponsored by the Gas Research Inst.
(PB83-194951; GRI-82/0040) Avail: NTIS HC A02/MF A01 CSCL 07D

Several theoretical schemes which directly relate various electronic spectroscopies to the total binding energy of molecules as well as to the adsorption energy of atoms and molecules on solid surfaces were investigated. If a reliable method is developed to bridge spectroscopy and bonding, a wealth of experimental data could lead to important implications for surface chemical reactions and catalysis. One promising avenue of approach is the combination of high energy photoemission spectroscopy and Auger spectroscopy. Related sum rules are under study. GRA

N83-34005# Oklahoma Univ., Norman. School of Chemical Engineering and Materials Science.
EQUATION OF STATE STUDY FOR POLAR FLUIDS Annual Report, 1 Nov. 1981 - 31 Oct. 1982
Kenneth E. Starling, Lloyd L. Lee, Ting-Horng Chung, Mahmoud Meng-Hui Li, and Mahmoud M. Khan Nov. 1982 158 p refs Sponsored by Gas Research Inst.
(PB83-195487; GRI-83/0002; AR-2) Avail: NTIS HC A08/MF A01 CSCL 07D

Two different types of equations of state were successfully developed for pure substances. One is based on the van der Waals framework, employing the hard convex body equation of state for the repulsive part and an empirically determined function for the attractive part. This equation was tested for normal paraffins and benzene and results show the equation is fairly accurate in predicting the bulk properties, especially in the dense liquid region. The second one is an empirical equation, which is based on the concept of perturbation theory. The statistical mechanical basis for the local composition model is presented in this work. Theoretical background is provided and a clearer definition and understanding of the local composition model is given, which is utilized in the subsequent project effort. GRA

N83-34823# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
INTERFEROMETRY [INTERFEROMETRIE]
G. Schwarz *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 1-16 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/ A01

N83-34824# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Stuttgart (West Germany).
ELEMENTARY REACTIONS DURING CxHy BURNING [ELEMENTARRIAKTIONEN BEI CxHy-VER-BRENNUNG]
Th. Just and H. H. Grotheer *In* Stuttgart Univ. Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 17-46 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

N83-34825# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Stuttgart (West Germany).
FLAME MEASUREMENTS USING ELECTRON BEAM FLUORESCENCE [FLAMMENDIAGNOSE DURCH ELEKTRONENSTRAHL-FLUORESZENZ]
Thomas Just and Hermann Eberius *In* Stuttgart Univ. Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82, 1982 p 47-86 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

N83-34826# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Stuttgart (West Germany).
FLAME MEASUREMENTS USING RAMAN SPECTROSCOPY

Final Report, 1974-1982 [FLAMMENDIAGNOSE DURCH RAMANSPEKTROSKOPIE]
Thomas Just and Winfried Stricker *In* Stuttgart Univ. Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 87-121 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

N83-34827# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
CONCENTRATION MEASUREMENTS IN SUPERSONIC FLOWS WITH CHEMICAL REACTIONS USING MASS SPECTROMETRY [MASSENSPEKTROMETRISCHE EN IN UEBERSCHALLSTROEMUNGEN MIT CHEMISCHEN REAKTIONEN]
A. Frohn *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 122-136 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

N83-34829# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Stuttgart (West Germany). Sonderforschungsbereich 85.
FLAME MEASUREMENTS USING COHERENT ANTI-STOKES RAMAN SCATTERING (CARS) [FLAMMENDIAGNOSE MIT CARS (COHERENT ANTI-STOKES RAMAN SCATTERING)]
Thomas Just and Winfried Stricker *In* Stuttgart Univ. Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 150-180 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

N83-34830# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
COMBUSTION [VERBRENNUNG]
J. Algermissen *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 183-219 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N83-34006# British Library Lending Div., Boston Spa (England).
THE INFLUENCE OF pH VALUE ON THE SORPTION OF Co60 ON CORROSION PRODUCT LAYERS ON AUSTENITIC STEEL AT A TEMPERATURE OF 95 DEG C
H. Rommel May 1983 3 p ref Transl. into ENGLISH of conf. paper from the 3rd RGW Symp. p 44-46
(BLL-Risley-TR-WH564-(9091.F)) Avail: NTIS HC A02/MF A01

The sorption of materials contained in water on corrosion product layers is regarded, after crud deposition, as an essential process in the migration of radionuclides onto the inner surfaces of the primary circuit of pressurized water reactors and thus jointly responsible for the build up of activity outside the core. Cobalt 60 sorption austenite sample plates with a hydrothermally produced corrosion product layer (approximately 1000 h hot water oxidation at 280 C and saturation pressure) were used as sorbents. The base sorption solution was water or boric acid of a mean primary circuit concentration of 4 g/l = 6.5 (-2)m at 95 C. Adjustment of the pH value was effected, as in the primary circuit, with KOH (max 3(-4) m) and NH3 (max 6(-4) m) or in the case of lower pH values with HC1O4 (max 3(-4) m). The Co(C1O4)2 concentration resulting from the carrier content of the Co60 was 1(-8) m or 1.2(-7) m. The pH value was varied between 3.5 and 7.2 and measured at room temperature. The variation in pH on temperature elevation from 25 C to 95 C is for the solution system +3% to +1%. S.L.

N83-34007# Electricity Council, London (England).
EFFECTS OF COLD-ROLLING ON THE FORMATION OF GP ZONES AND THE THETA PHASE IN THE AlCu 4% ALLOY
A. Zahra-Kubik, P. Vigier, and M. Wintenberger 7 Jun. 1983 16 p refs Transl. into ENGLISH from Colloq. Int. Cent. Nat. Rech. Sci., paper no. 201, France, 1971 p 245-257 Conf. held in Saclay, France, 29-30 Jun. 1971
(BLL-OA-Trans-3025-(6196.300)) Avail: British Library Lending Div., Boston Spa, Engl.

When a small percentage plastic deformation is effected immediately after quenching, the speed of formation of Guinier-Preston (GP) zones is considerably reduced. This phenomenon is explained by the rapid elimination of hardening vacancies by dislocations, which reduces the speed of diffusion of the solute atoms. It is then possible to show a period of nucleation of GP zones when pecipitation occurs at a high temperature (100 to 120 C). Moreover, towards 300 C, the presence of dislocations encourages the formation of phase theta prime in relation to the precipitation of theta double prime from the zones. These results were obtained from calorimetric measurements, measurements of electrical resistivity, mechanical tests and observations by electron microscope. Author

N83-34008# British Library Lending Div., Boston Spa (England).
ROLLED METAL FROM METAL POWDERS
B. F. Antipov, A. S. Vavilin, and L. S. Shmelev 24 May 1983 3 p Transl. into ENGLISH from Stal (USSR), no. 6, 1982 p 79-80
(BLL-M-34976-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The rolling of metal powders is a progressive method for producing porous and nonporous sheet and plate with special properties. Efficient layouts of the production lines are used in the shop, complex mechanization of laborious operations were introduced, and effective measures were taken for industrial safety and hygiene. Author

N83-34009# British Library Lending Div., Boston Spa (England).
SEPARATION OF COBALT IONS ON AUSTENITIC SURFACES IN THE PRESENCE OF VARIOUS ANIONS
J. Bosholm, H. Glaesel, O. Junge, and G. Reinhard 17 Jun. 1983 8 p refs Transl. into ENGLISH from Kernenergie (East Germany), no. 3, 1978 33 p
(BLL-WH-559-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

Activity build up in the primary circuit of pressurized water reactors and the transport of cobalt ions from aqueous solutions onto the surface of steel X8CrNiTi18.1O was investigated. The surface pretreatment, the cobalt ion concentration, the type of alkalizing medium, the pH value and the temperature were varied. Special anions of concentration .001 mol/kg influence the cobalt transition in the sequence borate < chloride < sulphate < phosphate < oxalate < citrate, ADTE. For the transition of cobalt ions from aqueous solutions into solid surface oxide phases a mechanism is proposed which, together with the experimental results obtained, permits a series of conclusions of importance to the technology of the primary circuit. Author

N83-34010# Steel Castings Research and Trade Association, Sheffield (England).
EXOGENEOUS INCLUSIONS AND THEIR RELATIONSHIP TO TEARS IN STEEL CASTINGS
P. Levicek and K. Stransky May 1983 6 p refs Transl. into ENGLISH from Slevarenstvi (Czechoslovakia), v. 8, no. 21, 1973 p 316-318
(BLL-Trans-686/MJ) Avail: British Library Lending Div., Boston Spa, Engl.

Analysis of the causes of tear formation in castings of magnetic rings has shown that, under certain circumstances, exogenous inclusions facilitate tear formation. The tear is then primarily propagated through the areas where exogenous inclusions are found in increased concentration. In the given case of castings

of 42 2640 steel, the exogenous inclusions were found to be part of pyrogel coatings for molds and cores. Author

N83-34011 National Physical Lab., Teddington (England). Div. of Materials Applications.
A SURVEY OF EXTANT DATA FOR THE SURFACE TENSION OF IRON AND ITS BINARY ALLOYS
B. J. Keene Jun. 1983 120 p refs
(NPL-DMA(A)-67; ISSN-0143-7313) Copyright. Avail: Issuing Activity

Data on melt composition and temperature effects concerning iron and over 30 binary iron alloys are presented. Surface adsorption data and the suggested surface structures based on them are also given. Author (ESA)

N83-34012 Defence Research Information Centre, Orpington (England).
MACROSEGREGATIONS IN LARGE STEEL INGOTS
K. Suzuki Jun. 1983 55 p refs Transl. into ENGLISH of Nippon Seikosho Giho (Japan), no. 40, 1981 p 1-11
(DRIC-T-6908; BR88630) Copyright. Avail: Issuing Activity

Structures responsible for generation of V and A-form segregations, and macrosegregations accompanying chemical composition heterogeneities in large killed steel ingots are discussed. The production of V-form segregations can be reduced by manipulating taper and height/diameter ratio. Methods for alleviating A-form segregations, such as the low Si vacuum carbon deoxidation method, give conflicting results. The multiple pouring method is promising for reducing component segregations, Author (ESA)

N83-34013 Defence Research Information Centre, Orpington (England).
STUDY IN IRRADIATION EMBRITTLEMENT OF NUCLEAR PRESSURE VESSEL STEELS - REPORT ON SA805, CL3 STEEL
H. Tsukuda, K. Suzuki, M. Kusuhashi, and Y. Tanaka Jun. 1983 38 p refs Transl. into ENGLISH of Nippon Seikosho Giho (Japan), no. 40, 1981 p 58-72
(DRIC-T-6909; BR88629) Copyright. Avail: Issuing Activity

Neutron irradiation embrittlement tests were carried out on 4 heats of SA508, Cl3, and 1 heat of SA533. Gr. B, using forged shells and steel plate of maximum thickness for PWRs, produced by forging, rolling and heat treatment. Standard vacuum stream degassing and deoxidation with carbon under vacuum were used. Embrittlement was evaluated by the change in transition temperatures and upper shelf energy occurring in the transition characteristics of the Charpy absorption energy. Results show that SA508, Cl3 has the same characteristics as SA533. Gr. B. Author (ESA)

N83-34014*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
IMPROVED THERMAL BARRIER COATING SYSTEM Patent Application
Stephan Steckra, inventor (to NASA) Filed 16 Aug. 1983 12 p
(NASA-Case-LEW-13324-2; US-Patent-Appl-SN-523297) Avail: NTIS HC A02/MF A01 CSCL 11F

A high temperature oxidation resistant thermal barrier coating system for a nickel, cobalt, or iron base alloy substrate is described. An inner metal bond coating contacts the substrate, and a thermal barrier coating covers the bond coating. NiCrAlR, FeCrAlR, and CoCrAlR alloys were satisfactory as bond coating compositions where R = Y or Yb. These alloys contain, by weight, 24.9 to 36.7% chromium, 5.4 to 18.5% aluminum, and 0.05 to 1.55% yttrium or 0.05 to 0.53% ytterbium. The coatings containing ytterbium are preferred over those containing yttrium. An outer thermal barrier coating of partially stabilized zirconium oxide (zirconia) which is between 6% and 8%, by weight, of yttrium oxide (yttria) covers the bond coating. Partial stabilization provides a material with superior durability. NASA

N83-34015*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PRELIMINARY RESULTS OF THE COMPARISON OF THE ELECTROCHEMICAL BEHAVIOR OF A THIOETHER AND BIPHENYL
Wilfredo Morales and William R. Jones Jul. 1983 18 p refs
(NASA-TM-83450; E-1555; NAS 1.15:83450) Avail: NTIS HC A02/MF A01 CSCL 11F

An electrochemical cell was constructed to explore the feasibility of using electrochemical techniques to simulate the tribochemistry of various substances. The electrochemical cell was used to study and compare the behavior of a thioether [1,3-bis (phenylthio) benzene] and biphenyl. It is found that under controlled conditions biphenyl undergoes a reversible reduction to a radical anion whereas the thioether undergoes an irreversible reduction yielding several products. The results are discussed in relationship to boundary lubrication. E.A.K.

N83-34016*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF THE AMOUNT OF Na_2SO_4 ON THE HIGH TEMPERATURE CORROSION OF UDIMET-700
A. K. Misra and F. J. Kohl 1983 19 p refs Presented at the Ann. Meeting of the Electrochemical Society, San Francisco, 8-13 May 1983
(NASA-TM-83459; E-1774; NAS 1.15:83459) Avail: NTIS HC A02/MF A01 CSCL 11F

The corrosion of Udimet-700, coated with different doses of Na_2SO_4, was studied in an isothermal thermogravimetric test in the temperature range 900 to 950 C. The weight gain curve is characterized by five distinct stages: an initial period of linear corrosion; an induction period; a period of accelerated corrosion; a period of decelerating corrosion; and a period of parabolic oxidation. The time required for the failure of the alloy increases with an increase in the amount of Na_2SO_4, reaches a peak and then decreases with further increase in the amount of Na_2SO_4. For low and intermediate doses (0.3 to 2.0 mg/sq cm), the catastrophic failure of the material occurs by the formation of Na_2MoO_4 and interaction of the liquid Na_2MoO_4 with the alloy. For heavy doses, the degradation of the material is due to the formation of large amounts of sulfides. Author

N83-34017# Materials Research Labs., Melbourne (Australia).
ESR STEELS FOR DEFENCE - STATE OF THE ART
R. J. OHalloran, ed. May 1983 38 p refs Seminar held in Melbourne, 14 Dec. 1982
(MRL-4-879; AR-003-289) Avail: NTIS HC A03/MF A01

The state of the art in defense uses of electroslag refining (ESR) of steels was reviewed. The ESR process was described and the local manufacturing facilities were detailed. The fatigue, fracture, weldability, machining, and corrosion properties of ESR steels were outlined, and the applications of ESR steels to the manufacture of armor and munitions were discussed. S.L.

N83-34018# Central Electricity Generating Board, London (England).
CORROSION TEST ON HIGH-ALLOY STEELS
W. M. M. Huijbregts 2 Jun. 1983 26 p Transl. into ENGLISH from Elektrotech. (Netherlands), no. 11, 1981 p 663-670
(BLL-CE-Trans-7952(9022.09)) Avail: British Library Lending Div., Boston Spa, Engl.

Pitting, cracking, and stress corrosion were studied in ferritic, austenitic, and duplex steels used in nuclear reactors, coal gasific gasifiers, and flue gas desulfurization plants. Electrochemical measuring techniques can determine resistance to pitting and cracking corrosion. The constant strain rate tensile test and the steam blanketing autoclave test appear well suited for determining resistance to stress corrosion and the effects of the chloride environment. Stress corrosion can occur in incoloy 800 in free caustic soda and in trisodium phosphate. The stress corrosion fracture takes place in an intercrystalline manner. A.R.H.

N83-34019*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FRICTION AND HARDNESS OF GOLD FILMS DEPOSITED BY ION PLATING AND EVAPORATION

Kazuhisa Miyoshi, Talivaldis Spalvins, and Donald H. Buckley Aug. 1983 10 p refs
(NASA-TP-2207; E-1528; NAS 1.60:2207) Avail: NTIS HC A02/MF A01 CSCL 11F

Sliding friction experiments were conducted with ion-plated and vapor-deposited gold films on various substrates in contact with a 0.025-mm-radius spherical silicon carbide rider in mineral oil. Hardness measurements were also made to examine the hardness depth profile of the coated gold on the substrate. The results indicate that the hardness is influenced by the depth of the gold coating from the surface. The hardness increases with an increase in the depth. The hardness is also related to the composition gradient in the graded interface between the gold coating and the substrate. The graded interface exhibited the highest hardness resulting from an alloy hardening effect. The coefficient of friction is inversely related to the hardness, namely, the load carrying capacity of the surface. The greater the hardness that the metal surface possesses, the lower is the coefficient of friction. The graded interface exhibited the lowest coefficient of friction. Author

N83-34020*# Kentron International, Inc., Hampton, Va.
THE DIMENSIONAL STABILITY ANALYSIS OF SEVENTEEN STEPPED SPECIMENS OF 18Ni 200 GRADE, PH13-8Mo AND A-286
D. A. Wigley Aug. 1983 60 p refs Prepared in cooperation with Applied Cyrogenics and Materials Consultants
(Contract NAS1-16000)
(NASA-CR-172168; NAS 1.26:172168) Avail: NTIS HC A04/MF A01 CSCL 11F

This report documents the results of a dimensional stability analysis of seventeen stepped specimens that were used in the evaluation of factors influencing warpage in metallic alloys being used for cryogenic wind tunnel models. Specimens used in the analysis were manufactured from 18Ni 200 Grade Maaraging steel, PH13-8Mo, and A-286 stainless steel. Quantitative data are provided on the behavior of the specimens due to the effects of both machining and cryogenic cycling effects. Author

N83-34021# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Materials Lab.
THE DYNAMIC PLASTIC DEFORMATION OF METALS: A REVIEW Interim Report, Jun. - Dec. 1981
J. Duffy Oct. 1982 227 p refs
(AD-A126606; AFWAL-TR-82-4024) Avail: NTIS HC A11/MF A01 CSCL 11/6

The dynamic deformation of metals at strain rates from the quasistatic up to about 104s-1 was reviewed. Macroscopic material behavior as it is influenced by strain rate and temperature is emphasized. Wave propagation experiments are discussed, but greater weight is placed on tests with specimens short enough so the state of stress is homogeneous within the specimen. Possible applications, such as armor penetration, metal forming, or machining are reviewed. GRA

N83-34022# General Electric Co., Schenectady, N. Y. Corporate Research and Development Center.
INVESTIGATION FOR THE NOVEL FORMATION OF HIGH ENERGY PRODUCT Fe COMPACTS Final Report, 1 Sep. 1981 - 31 Aug. 1982
A. E. Berkowitz May 1983 56 p refs
(Contract N00014-81-C-0751)
(AD-A128899; SRD-83-022) Avail: NTIS HC A04/MF A01 CSCL 11/6

Two novel approaches were examined for the production of economical permanent magnets containing little or no critical materials. The first approach was to induce a strong surface anisotropy or spin pinning on Fe particles by coating them with suitable materials. Another aspect of this approach was to gain a deeper understanding of the mechanism of spin pinning. The principal positive result in this case was the establishment, by neutron diffraction, that spin pinning does occur on ferrite particles when coated with oleic acid. The second approach was to prepare rapidly quenched precursor particles of various alloys and then anneal them to produce optimum magnetic properties. One result of this work was a demonstration of how different degrees of chemical short range order resulting from different quench rates yield different crystallization behavior, thus affording a measure of control over magnetic properties. Another important result of this phase was that very promising properties were produced in Mn-Al-C particles. Author (GRA)

N83-34023# California Univ., Berkeley. Dept. of Chemical Engineering.
PLASMA-ENHANCED DEPOSITION AND PROCESSING OF TRANSITION METAL SILICIDES Final Report, 1 Oct. 1980 - 31 Jan. 1983
Dennis W. Hess 25 Apr. 1983 22 p refs
(Contract DAAG29-80-K-0086)
(AD-A128817; ARO-17536.3-MS) Avail: NTIS HC A02/MF A01 CSCL 11/6

Radiofrequency (RF) discharges of tungsten hexafluoxide/hydrogen or molybdenum/hexafluoride/hydrogen have been used to deposit films of tungsten or molybdenum. The tungsten depositions resulted in high purity films with as-deposited resistivities ranging from 40 to 170 micron omega cm, depending upon the deposition conditions. Short (<20 min) heat treatments in hydrogen/nitrogen atmospheres at temperatures above 700 deg C resulted in a decrease in the resistivity of the films to approximately 8 micron omega-cm, essentially independent of the initial film resistivity. Unlike tungsten, molybdenum films displayed high (>10,000 micron omega cm) resistivities. These results were due to approximately 15 atomic percent fluorine incorporated into the film structure during deposition. Author (GRA)

N83-34024# Cambridge Univ. (England). Dept. of Engineering.
THE PRESENTATION OF HIGH STRAIN-RATES ON DEFORMATION MECHANISM MAPS Final Technical Report, Jul. 1980 - Jul. 1982
P. M. Sargent and M. F. Ashby Mar. 1983 42 p refs
(Contract DAFA37-80-C-0333; DA Proj. 1T1-61102-BH-57)
(AD-A128822; CUED/C-MATS/TR.98) Avail: NTIS HC A03/MF A01 CSCL 11/6

Phonon drag, power-law breakdown and the condition for adiabatic shear are expressed in terms of material properties, a critical strain-rate, and a critical strain. This information is incorporated into the construction of deformation-mechanism maps, which then show a field of drag-controlled plasticity and one of adiabatic shear (in which unstable flow may occur), together with the more usual fields of stable plasticity, power-law creep, diffusional flow and so forth. Where possible, the results have been compared with, and matched to, experiments. GRA

N83-34025# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
THEORETICAL PREDICTIONS OF MELTING RATES IN A POWDER-FED GLASS MELTER
Kenneth R. Routt, Marion B. Cosper, and Daniel C. Iverson 1983 9 p Presented at the 13th Intern. Glaskongress, Hamburg, 4-9 Jul. 1983 Submitted for publication
(Contract DE-AC09-76SR-00001)
(DE83-011382; DP-MS-82-56) Avail: NTIS HC A02/MF A01

Borosilicate glass is used to vitrify liquid, radioactive waste resulting from the manufacture of defense materials at the Savannah River Plant into a solid product for storage in an underground repository. The conceptual design of the glass melter consists of a refractory lined, water cooled, steel vessel in which the glass is melted by Joule heating before being poured into stainless steel canisters. Although current plans are to feed a glass frit/waste mixture to the melter as an aqueous slurry, previous studies also evaluated feeding of a powdered frit/waste mixture. Author

N83-34026# Naval Ship Research and Development Center, Annapolis, Md.
SPECIMEN GEOMETRY AND EXTENDED-CRACK-GROWTH EFFECTS ON J SUB R CURVE CHARACTERISTICS FOR

HY-130 AND ASTM A533B STEELS
D. A. Davis, M. G. Vassilaros, and J. P. Gudas May 1983 53 p refs Sponsored by Nuclear Regulatory Commission
(DE83-902021; NUREG/CR-3089) Avail: NTIS HC A04/MF A01

An evaluation of the ductile fracture toughners and sub I-R curve properties of HY-130 and ASTM A533B-HSST-O3 steels in response to systematic variations of thickness and crack length n the side grooved compact specimen geometry was carried out. A series of 2T compact specimens were produced to varying thicknesses, and with various fatigue crack lengths. Elastic compliance J sub I-R curve tests were performed, and analyses of J sub Ic, the slope of the J sub I-R, and an assessment of the criterion for J controlled crack growth were carried out. Results showed that J sub Ic of both steels was geometry independent when validity criteria were met. Both steels displayed a clear dependence of the slope of the J sub I-R curve as related to thickness/ligament ratio and degree of crack extension. A limiting thickness/ligament ratio of 1 is necessary to ensure a conservative J sub I-R curve slope over the full range of crack growth. DOE

N83-34027# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
THE INFLUENCE OF MAGNESIUM ADDITION TO THE BRONZE ON THE CRITICAL CURRENT OF BRONZE-PROCESSED MULTIFILAMENTARY Nb3Sn
I. W. Wu, D. R. Dietderich, J. T. Holthuis, W. V. Hassenzahl, and J. W. Morris, Jr. Nov. 1982 13 p refs Presented at the 1982 Appl. Superconductivity Conf., Knoxville, Tenn., 30 Nov. - 3 Dec. 1982
(Contract DE-AC03-76SF-00098)
(DE83-012482; LBL-15336) Avail: NTIS HC A02/MF A01

The addition of magnesium to the bronze matrix prior to the formation of bronze processed Nb3Sn tape causes a significant increase in the critical superconducting current density at 6.5 tesla, and that this increase is associated with a decrease in the apparent A15 grain size. Determination of whether a similar improvement in J(sub c) would follow the addition of mg to multifilamentary Nb3Sn wires and identification of the microstructural and mechanistic sources of any beneficial effects were performed. Critical current densities were measured as a function of bronze composition, heat treatment, and transverse magnetic field at 4.2 K. The reacted A15 layers were subsequently examined using a variety of microscopic and microanalysis techniques. Author

N83-34028# Argonne National Lab., Ill. Materials Science Div.
POSITRON-ANNIHILATION SPECTROSCOPY OF DEFECTS IN METALS: AN ASSESSMENT
R. W. Siegel Jun. 1982 19 p refs Presented at the 6th Intern. Conf. on Positron Annihilation, Arlington, Tex., 3-7 Apr. 1982 Submitted for publication
(Contract W-31-109-eng-38)
(DE83-007717; CONF-820434-16) Avail: NTIS HC A02/MF A01

Positron annihilation spectroscopy (PAS) made significant contributions to our knowledge regarding lattice defects in metals in two areas: the determination of atomic defect properties, particularly those of monovacancies, and the monitoring and characterization of vacancy like microstructure development during post irradiation of post quench annealing. The application of PAS to the study of defects in metals is selectively reviewed and critically assessed within the context of other available techniques for such investigations. Possibilities for using the positron as a localized probe of the structure of atomic defects are discussed. Finally, the present status and future potential of PAS as a tool for the study of defects in metals are considered relative to other available techniques. DOE

N83-34029# California Univ., Livermore. Lawrence Livermore Lab.
MICROSTRUCTURAL MODIFICATION OF ALUMINUM-SILICON ALLOY POWDERS DURING DYNAMIC CONSOLIDATION
W. H. Gourdin and J. E. Smugeresky 23 Nov. 1982 8 p refs Presented at the 3rd Natl. Conf. on Rapid Solidification Process.: Principles and Technol., Gaithersburg, Md., 6-8 Dec. 1982
(Contract W-7405-eng-48)
(DE83-003884; UCRL-88400; CONF-821223-1) Avail: NTIS HC A02/MF A01

The preliminary results of the dynamic consolidation of a rapidly solidified aluminum-6% silicon alloy powder are described. The microstructure of this alloy, consisting of a dispersion of silicon precipitates at the boundaries of essentially pure aluminum grains, provides an excellent grid against which to observe the changes induced by shock compaction. Examination of recovered specimens, shocked with either explosives or high velocity projectiles, shows that at low stress, high density is achieved without substantial interparticle bonding, and the microstructure is essentially that of the starting powder. For stresses between 1.7 and 2.6 GPa increasing compact integrity, and the appearance of regions of altered microstructure at the interfaces between powder particles were observed. Above 4.0 GPa such modified material is a distinctive feature of the microstructure, and compacts are well bonded. DOE

N83-34030# Sandia Labs., Albuquerque, N. Mex.
SOME EFFECTS OF MICROSTRUCTURE AND CHEMISTRY ON CORROSION AND HYDROGEN EMBRITTLEMENT OF TiCODE-12
J. A. Ruppen, R. B. Diegle, R. S. Glass, and T. J. Headley 1982 9 p refs Presented at the 6th Intern. Symp. on the Sci. Basis for Radioactive Waste Management, Boston, 1 Nov. 1982
(Contract DE-AC04-76DP-00789)
(DE83-001364; SAND-82-1279C; CONF-821107-35) Avail: NTIS HC A02/MF A01

Effects of microstructure and chemistry on corrosion and hydrogen embrittlement of TiCode-12 were investigated. Heat treating mill-annealed TiCode-12 in the temperature range 500 to 750 C results in a sensitization effect, i.e., an increase in the uniform corrosion rate when tested in either boiling 1N HCl or a MgCl2 brine. This effect is caused by microstructural changes involving the precipitation of Ti2Ni. Electrochemical studies indicate that sensitization results from galvanic coupling between Ti2Ni, acting as cathode, and the alpha-Ti matrix with resultant shifts in corrosion potential. Increasing the Fe content of the alloy promotes the sensitization effect. Hydrogen embrittlement of TiCode-12 was studied using the slow strain rate technique. Hydrogen concentrations to 130 wppm did not cause embrittlement. However, above 220 wppm hydrogen, degradation was observed as a decrease in mechanical behavior and the appearance of cleavage-like secondary cracks. DOE

N83-34031# California Univ., Livermore. Lawrence Livermore Lab.
QUANTITATIVE ADHESION DATA FOR ELECTROLESS NICKEL DEPOSITED ON VARIOUS SUBSTRATES
J. W. Dini and H. R. Johnson (Sandia National Labs., Livermore, Calif.) 20 Sep. 1982 17 p refs Presented at the Electroless Nickel Conf., Chicago, 29-31 Mar. 1983
(Contract W-7405-eng-48)
(DE83-000363; UCRL-86807-Rev-1; CONF-830306-1-Rev-1) Avail: NTIS HC A02/MF A01

A review of the literature on quantitative adhesion of electroless nickel coatings is given. Recent ring shear quantitative data for the electroless nickel deposited on a variety of substrates is presented. Procedures for obtaining good adhesion between electroless nickel coatings and a variety of aluminum alloys (1100, 2024, 5083, 6061 and 7075), beryllium-copper, 4340 steel, HP 9-4-20 steel, and U-0.75 Ti are outlined. In addition, data are presented on a procedure for activating electroless nickel for subsequent coating with electrodeposited nickel. DOE

N83-34032# Argonne National Lab., Ill.
KINETICS OF RADIATION-INDUCED SEGREGATION IN TERNARY ALLOYS
N. Q. Lam, A. Kumar, and H. Wiedersich 1982 24 p refs Presented at 11th Intern. Symp. on Effects of Radiation on Mater., Am. Soc. for Testing and Mater., Scottsdale, Ariz., 28 Jun. 1982
(Contract W-31-109-eng-38)

(DE83-007741; CONF-820628-21) Avail: NTIS HC A02/MF A01

Model calculations of radiation-induced segregation internary alloys have been performed, using a simple theory. The theoretical model describes the coupling between the fluxes of radiation-induced defects and alloying elements in an alloy A-B-C by partitioning the defect fluxes into those occurring via A-, B-, and C-atoms, and the atom fluxes into those taking place via vacancies and interstitials. The defect and atom fluxes can be expressed in terms of concentrations and concentration gradients of all the species present. With reasonable simplifications, the radiation-induced segregation problem can be cast into a system of four coupled partial-differential equations, which can be solved numerically for appropriate initial and boundary conditions. Model calculations have been performed for ternary solid solutions intended to be representative of Fe-Cr-Ni and Ni-Al-Si alloys under various irradiation conditions. DOE

N83-34033# Sandia Labs., Albuquerque, N. Mex.

LOW CYCLE FATIGUE AND CREEP-FATIGUE TESTING OF SALT-FILLED ALLOY 800 SPECIMENS Final Report

J. L. Kaae May 1982 27 p refs

(Contract DE-AC04-76DP-00789)

(DE82-015730; SAND-82-8182) Avail: NTIS HC A03/MF A01

Uniaxial low cycle fatigue and creep fatigue tests were carried out on hollow alloy 800 specimens that were either filled with air or with a molten mixture of sodium nitrate, potassium nitrate and an oxidizer. Low cycle fatigue tests were carried out at 1200 F and 650 F by cycling the strain continuously between equal mangitude of tensile and compressive values at a rate of .004/sec until failure. The creep fatigue tests were carried out at 1200 F. Crack always initiated on the inner surface of the hollow specimen, and therefore, corrosive effects on crack propagation and initiation were controlled by the environment within the specimen cavity. Tests with air-filled specimens indicated that the presence of the molten salt degraded the fatigue life at 1200 F but did not affect the creep fatigue life, while the presence of steam enhanced both the fatigue life and the creep fatigue life. DOE

N83-34034# Stanford Univ., Calif. Dept. of Materials Science and Engineering.

DIFFUSION OF OXYGEN IN LIQUID-METAL SYSTEMS Final Report

David A. Stevenson Jan. 1983 15 p

(Contract DE-AT03-76ER-70037)

(DE83-005819; DOE/ER-70034/T1) Avail: NTIS HC A02/MF A01

Kinetic and thermodynamic measurements in liquid metal oxygen systems were investigated. Electrochemical cells with solid oxide electrolytes in several different configurations were utilized. The principal properties studied include: activities of the components in binary metal-metal alloy systems; oxygen solubility and oxygen diffusivity in pure liquid metals and liquid metal alloys; and the free energy of formation of pure metal oxides. The techniques of solid state electrochemistry were developed and the limitations of the techniques studied. Sufficient problems with the zirconia electrolytes exist to consider a separate study on the degradation of zirconia electrolytes while in use. The electrolytic properties, as measured by complex impedance spectroscopy, is correlated with the microstructure, evaluated by X-ray, optical microscopy, scanning electron microscopy and transmission electron microscopy. Mechanisms for electrolyte degradation are proposed. DOE

N83-34035# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

CRACK AND CAVITY NUCLEATION AT INTERFACES DURING CREEP

M. H. Yoo and H. Trinkaus 1982 62 p refs Presented at the 111th AIME Ann. Meeting, Dalias, 1 Feb. 1982

(Contract W-7405-eng-26)

(DE83-007513; CONF-820205-6) Avail: NTIS HC A04/MF A01

A thermal nucleation of microcracks and thermal nucleation of cavities during creep deformation are reviewed and effects of solute segregation to grain boundaries and cavity surfaces are emphasized. The magnitude and the duration of stress concentration at a triple grain junction or at a grain boundary inclusion are estimated for transient Coble creep and steady state power law creep conditions. Stable configurations of wedge type microcracks are predicted by a Griffith like crack model. The rate for thermal nucleation of cavities is obtained by the Fokker-Planck equation for vacancy clusters. Cracks and cavities are interdependent, and cavity nucleation occurs continuously throughout the three creep stages. The local stress concentration enhances microcrack and cavity nucleation. The cavity nucleation rate is generally increased as a result of solute segregation to the surfaces and interfaces. Immobile solute or trace elements affect the nucleation rate by changing the grain boundary diffusivity. Mobile solutes or impurities having high vapor pressure enhance cavity nucleation by creating an internal pressure. Experimental techniques for quantitative analyses of cavity nucleation processes are discussed. DOE

N83-34036# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

THE INFLUENCE OF ALLOY MICROSTRUCTURE ON Al2O3-PEG MORPHOLOGIES IN CoCrAl ALLOYS AND COATINGS M.S. Thesis

Rajendra Dattatraya Pendse Jun. 1982 68 p refs

(Contract DE-AC03-76SF-00098)

(DE82-020336; LBL-14668) Avail: NTIS HC A04/MF A01

A comparative study of Al2O3-peg morphologies in oxidized Co10Cr11Al1Y and Co10Cr11A11Hf as-cast alloys was carried out with a view to examine the ole of alloy/coating microstructure in the pegging process. No direct connection between the two was established. However, deeply penetrating internal Al2O3-sheaths were observed associated with the microstructurally segregated yttride phase at the Alpha/Beta boundaries in the oxidized CoCrAlY alloy; no sheaths were found in the CoCrAlHf alloys. These observations in conjunction with the previous observations of sheaths in vapor-deposited coatings are considered as evidence of an indirect influence of microstructure on the pegging process. A zone depleted of the Beta phase was observed below the scale in all oxidized alloys. Simple observations and calculations on the zone-thickness were made with a view to elucidate the pegging mechanism. These were not entirely conclusive and additional work was found necessary. DOE

N83-34037# Brookhaven National Lab., Upton, N. Y. Dept. of Nuclear Energy.

STUDY OF PITTING CORROSION OF ALUMINIUM BY MEANS OF THE SCANNING VIBRATING-ELECTRODE TECHNIQUE

Y. Ishikawa (Hitachi Ltd., Tokyo) and H. S. Isaacs 1983 22 p refs

(Contract DE-AC02-76CH-00016)

(DE83-013065; BNL-33059) Avail: NTIS HC A02/MF A01

The pitting behavior of aluminum was measured in 10 to 230 ppM chloride ion and with four inhibitors (acetate, nitrate, phosphate and sulfate) in the range 10 to 70 ppM. Initiation, growth and repassivation of pits were monitored by the scanning vibrating electrode technique. The potentiodynamic polarization behavior of specific pits was examined. All the inhibitors were ineffective in repassivating pits developed prior to cathodic polarization. Nitrate and sulfate appeared to prevent pit growth after cathodic protection of developed pits. However, phosphate tended to accelerate the pitting corrosion, while acetate did not show a significant effect. DOE

N83-34038# California Univ., Livermore. Lawrence Livermore Lab.

STUDY OF Cu-Be ALLOYS IN THE VICINITY OF THE EUTECTOID COMPOSITION Ph.D. Thesis - Rouen Univ., 1977

Xavier Auvray May 1983 9 p refs

(DE83-011639; UCRL-Trans-118-67) Avail: NTIS HC A02/MF A01

A study of the decomposition of the (alpha) phase in Cu-Be was conducted with alloys of be content between 4.5 and 11 wt% Be. Depending on the quencing rate, several different structural

states are obtained, corresponding to successive stages of the decompositon of (alpha). The (alpha) phase is never retained in the completely disordered state, no matter what the quenching rate and alloy composition. DOE

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N83-34039* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
METHOD OF NEUTRALIZING THE CORROSIVE SURFACE OF AMINE-CURED EPOXY RESINS Patent
Sheng Y. Lee, inventor (to NASA) Issued 7 Dec. 1982 3 p Filed 14 Aug. 1981 Supersedes N82-10227 (20 - 01, p 0035)
(NASA-Case-GSC-12686-1; US-Patent-4,362,769;
US-Patent-Appl-SN-293412; US-Patent-Class-427-322;
US-Patent-Class-427-340; US-Patent-Class-427-352;
US-Patent-Class-427-400; US-Patent-Class-427-407.1) Avail: US Patent and Trademark Office CSCL 11G

The corrosive alkaline surface layer of an epoxy resin product formed by the curing of the epoxy with an aliphatic amine is eliminated by first applying a non-solvent to remove most or all of the free unreacted amine and then applying a layer of a chemical reagent to neutralize the unused amine or amine functional groups by forming a substituted urea. The surface then may be rinsed with acetone and then with alcohol. The non-solvent may be an alcohol. The neutralizing chemical reagent is a mono-isocyanate or a mono-isothiocyanate. Preferred is an aromatic mono-isocyanate such as phenyl isocyanate, nitrophenyl isocyanate and napthyl isocyanate.

Official Gazette of the U.S. Patent and Trademark Office

N83-34040* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
POLYPHENYLQUINOXALINES CONTAINING PENDANT PHENYLETHYNYL AND ETHYNYL GROUPS Patent
Paul M. Hergenrother, inventor (to NASA) (Virginia Polytechnic Inst. and State Univ.) Issued 1 Mar. 1983 11 p Filed 12 Nov. 1981 Supersedes N82-26463 (20 - 17, p 2381) Sponsored by NASA
(NASA-Case-LAR-12838-1; US-Patent-4,375,536;
US-Patent-Appl-SN-320621; US-Patent-Class-528-125;
US-Patent-Class-526-259; US-Patent-Class-526-285;
US-Patent-Class-528-12; US-Patent-Class-528-38;
US-Patent-Class-528-126; US-Patent-Class-528-128;
US-Patent-Class-528-220; US-Patent-Class-528-222;
US-Patent-Class-528-228; US-Patent-Class-528-229) Avail: US Patent and Trademark Office CSCL 11C

Poly(phenylquinoxaline) prepolymers containing pendant phenylethynyl and ethynyl groups are disclosed along with the process for forming these polymers. Monomers and the process for producing same that are employed to prepare the polymers are also disclosed.

Official Gazette of the U.S. Patent and Trademark Office

N83-34041* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SOLVENT RESISTANT THERMOPLASTIC AROMATIC POLY (IMIDESULFONE) AND PROCESS FOR PREPARING SAME Patent
Terry L. St.Clair and David A. Yamaki, inventors (to NASA) Issued 9 Aug. 1983 4 p Filed 11 Aug. 1982 Supersedes N83-13259 (21 - 04, p 0497)
(NASA-Case-LAR-12858-1; US-Patent-4,398,021;
US-Patent-Appl-SN-407240; US-Patent-Class-528-222;
US-Patent-Class-264-137; US-Patent-Class-264-258;
US-Patent-Class-164-331.12; US-Patent-Class-264-331.46;
US-Patent-Class-528-226) Avail: US Patent and Trademark Office CSCL 11G

A process for preparing a thermoplastic poly(imidesulfone) is disclosed. This resulting material has thermoplastic properties which are generally associated with polysulfones but not polyimides, and solvent resistance which is generally associated with polyimides but not polysulfones. This system is pocessable in the 250 to 350 C range for molding, adhesive and laminating applications. This unique thermoplastic poly(imidesulfone) is obtained by incorporating an aromatic sulfone moiety into the backbone of an aromatic linear polyimide by dissolving a quantity of a 3,3',4,4'-benzophenonetetracarboxylic dianhydride (BTDA) in a solution of 3,3'-diaminodiphenylsulfone and bis(2-methoxyethyl)ether, precipitating the reactant product in water, filtering and drying the recovered poly(amide-acid sulfone) and converting it to the poly(imidesulfone) by heating.

Official Gazette of the U.S. Patent and Trademark Office

N83-34042 Defence Research Information Centre, Orpington (England).
EFFECT OF HEAT TREATMENT ON THE STRENGTH OF ALUMINIUM-BOROSILICATE GLASS FIBRE
I. P. Guseva, S. N. Novikov, and A. P. Stepanov May 1983 15 p refs Transl. into ENGLISH of Fiz. i Khimiya Obrabotki Materialov (USSR), no. 4, 1973 p 110-117
(DRIC-T-6936; BR88328) Copyright. Avail: Issuing Activity

The effect of heat treatment on the strength of aluminum-borosilicate glass fiber was investigated in the temperature range 50 to 500 C. Low temperature adsorption and mercury porometry methods were used to study the surface of the glass. The direct cause of the sharp decrease in strength in the interval 200 to 300 C is the formation of surface cracks. Mass spectrometric measurements coupled with nuclear magnetic resonance spectral investigation of boron nuclei indicate that the formation of these defects is associated with the chemisorption of atmospheric oxygen on coordinatively unsaturated centers at the surface. Author (ESA)

N83-34043* National Aeronautics and Space Administration. Pasadena Office, Calif.
ANTENNA GROUT REPLACEMENT SYSTEM Patent
Charles E. McClung, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 26 Jul. 1983 6 p Filed 10 Feb. 1981 Supersedes N81-19457 (19 - 10, p 1354) Sponsored by NASA
(NASA-Case-NPO-15202-1; US-Patent-4,395,503;
US-Patent-Appl-SN-233271; US-Patent-Class-523-440;
US-Patent-Class-523-443; US-Patent-Class-384-124) Avail: US Patent and Trademark Office CSCL 11G

An epoxy grout suitable for use in mounting and positioning bearing runner plates used in hydrostatic bearing assemblies for rotatably mounting large radio telescope structures to stationary support pedestals is described. The epoxy grout may be used in original mountings or may be used as part of a replacement system for repairing cavities in existing grout resulting from grout deterioration. The epoxy grout has a relatively short work life and cure time even in the presence of hydraulic oil. The epoxy grout cures without shrinking or sagging to form a grout which is sufficiently strong and durable to provide a grout especially well suited for use under the high pressure loading and close tolerance requirements of large hydrostatic bearing assemblies.

Official Gazette of the U.S. Patent and Trademark Office

N83-34044*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HOT MELT ADHESIVE ATTACHMENT PAD Patent Application
Robert L. Fox, Alan W. Frizzill, Bruce D. Little, Donald J. Progar, Robert H. Coultrip, Richard H. Couch, John R. Gleason, Bland A. Stein, John D. Buckley, inventors (to NASA), and Terry L. St.Clair Filed 22 Jul. 1983 14 p
(NASA-Case-LAR-12894-1; US-Patent-Appl-SN-516087) Avail: NTIS HC A02/MF A01 CSCL 11A

The invention relates to a hot melt adhesive attachment pad for releasably securing distinct elements together and particularly useful in the construction industry or a spatial vacuum environment. The attachment pad consists primarily of a cloth selectively

impregnated with a charge of hot melt adhesive, a thermofoil heater and a thermocooler. These components are security mounted in a mounting assembly. In operation, the operator activates the heating cycle transforming the hot melt adhesive to a substantially liquid state, positions the pad against the attachment surface, and activates the cooling cycle solidifying the adhesive and forming a strong, releasable bond. NASA

N83-34045*# Cincinnati Univ., Ohio. Solid State Electronics Lab.
RESEARCH INTO THE USE OF PYROLYTIC OXIDES AND POLYMERS FOR THE FABRICATION OF THIN FILM HIGH ENERGY CAPACITORS Final Report
Joseph H. Nevin Jun. 1983 134 p
(Grant NSG-3024)
(NASA-CR-173012; NAS 1.26:173012) Avail: NTIS HC A07/MF A01 CSCL 11G

Construction, capacitance and dissipation factor, and electrode materials for single layer capacitors are discussed. Basic construction, phosphosilicate glass, ten layer capacitors, twenty layer capacitors, stress measurements, buffered oxide layers, and 30 layer capacitors are also discussed. Spin-on phosphosilicate glass is addressed. Polymers as dielectric materials are also considered. Author

N83-34046*# Virginia Research, Inc., Arlington. Dept. of Chemistry.
POLYARYL ETHERS AND RELATED POLYSILOXANE COPOLYMER MOLECULAR COATINGS PREPARATION AND RADIATION DEGRDATION Final Report
J. E. McGrath, J. L. Hedrick, D. C. Webster, B. C. Johnson, D. K. Mohanty, and I. Yilgor Jun. 1983 78 p refs
(Contract NCC1-63)
(NASA-CR-173059; NAS 1.26:173059) Avail: NTIS HC A05/MF A01 CSCL 11B

Poly(arylene ether sulfones) comprise a class of materials known as engineering thermoplastics which have a variety of important applications. These polymers are tough, rigid materials with good mechanical properties over a wide temperature range, and they are processed by conventional methods into products typically having excellent hydrolytic, thermal, oxidative and dimensional stability. Wholly aromatic random copolymers of hydroquinone and biphenol with 4.4 prime dichlorodiphenyl sulfone were synthesized via mechanical nucleophilic displacement. Their structures were characterized and mechanical behavior studied. These tough, ductile copolymers show excellent radiation resistance to electron beam treatment and retain much of the mechanical properties up to at least 700 Mrads under argon. Author

N83-34047*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
DEVELOPMENT OF LOW VISCOSITY ALKANE-BASED URETHANE FOR CONNECTOR POTTING APPLICATIONS
Donald E. Morris Jul. 1983 28 p refs
(NASA-TM-82544; NAS 1.15:82544) Avail: NTIS HC A03/MF A01 CSCL 11G

Two series of saturated hydrocarbon-based urethanes were prepared with isophorone diisocyanate and one series with methyl bis (4-cyclohexyl isocyanate). The urethanes with molecular weights as great as 2500 had viscosities low enough and a working life long enough to be used in potting, molding, and coating applications. Specimens were prepared and mechanical properties such as hardness, tensile strength elongation, and tear strength were determined. Thermomechanical properties (glass transition and expansion coefficient) and thermogravimetric properties were determined. Author

N83-34048*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SEARCH FOR SELECTIVE ION DIFFUSION THROUGH MEMBRANES
Charles E. May and Warren H. Philipp Jun. 1983 13 p refs
(NASA-TM-83426; E-1715; NAS 1.15:83426) Avail: NTIS HC A02/MF A01 CSCL 07D

The diffusion rates of several ions through some membranes developed as battery separators were measured. The ions investigated were Li(+), Rb(+), Cl(-), and So4. The members were crosslinked polyvinyl alcohol, crosslinked polyacrylic acid, a copolymer of the two, crosslinked calcium polyacrylate, cellulose, and several microporous polyphenylene oxide based films. No true specificity for diffusion of any of these ions was found for any of the membranes. But the calcium polyacrylate membrane was found to exhibit ion exchange with the diffusing ions giving rise to the leaching of the calcium ion and low reproducibility. These findings contrast earlier work where the calcium polyacrylate membrane did show specificity to the diffusion of the copper ion. In general, Fick's law appeared to be obeyed. Except for the microporous membranes, the coefficients for ion diffusion through the membranes were comparable with their values in water. For the microporous membranes, the values found for the coefficients were much less, due to the tortuosity of the micropores. Author

N83-34049*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE EFFECTS OF METALS AND INHIBITORS ON THERMAL OXIDATIVE DEGRADATION REACTIONS OF UNBRANCHED PERFLUOROALKYLETHERS
William R. Jones, Jr., K. J. L. Paciorek (Ultrasystems, Inc., Irvine, Calif.), D. H. L. Harris (Ultrasystems, Inc., Irvine, Calif.), M. E. Smythe (Ultrasystems, Inc., Irvine, Calif.), and R. H. Kratzer (Ultrasystems, Inc., Irvine, Calif.) Jul. 1983 20 p refs Presented at the 6th Winter Symp. on Fluorine Chem., Daytona Beach, Fla., 6-11 Feb. 1983; sponsored by American Chemical Society
(NASA-TM-83464; E-1729; NAS 1.15:83464) Avail: NTIS HC A02/MF A01 CSCL 11G

Thermal oxidative degradation studies were performed on unbranched perfluoroalkylethers at 288 C in oxygen. Metals and alloys studied included Ti, Al, and Ti (4 Al, 4 Mn). The mechanism of degradation was by chain scission. Ti and Al promoted less degradation than Ti (4 Al, 4 Mn). The two inhibitors investigated (a perfluorophenyl phosphine and a phosphatriazine) reduced degradation rates by several orders of magnitude. Both inhibitors were effective for the same duration (75 to 100 hours). The phosphatriazine appeared to provide more surface protection. Author

N83-34050*# National Aeronautics and Space Administration, Washington, D. C.
DETERMINATION OF PARTICULATE SIZES IN CERAMIC POWDERS BY ELECTRON MICROSCOPY
Alfons Stiegelschmitt and Gerhard Tomandl Apr. 1983 9 p refs Transl. into ENGLISH from Ber. der Deut. Karamischen Ges. (West Germany), v. 55, no. 2, 1978 p 76-78 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-77056; NAS 1.15:77056) Avail: NTIS HC A02/MF A01 CSCL 11G

Ceramic powders of small particulate size can be characterized by electron microscopy. The usual methods of powder preparation were tested and compared. The data are analyzed in two ways. Author

N83-34051# Materials Research Labs., Melbourne (Australia).
AN EPOXY RESIN CURED WITH DIAMINO DIPHENYL SULPHONE, THE EFFECT OF MATERIAL SOURCE, FABRICATION CONDITIONS AND ENVIRONMENT OF MECHANICAL PROPERTIES
E. P. Gellert May 1983 23 p refs
(MRL-R-876; AR-003-286) Avail: NTIS HC A02/MF A01

Epoxy resin samples cured with 4,4 prime-diamino diphenyl sulphone were subjected to tensile, flexural and impact tests to assess the effect on the cured resin of material source, fabrication conditions and environment. Aging at room temperature caused the greatest deterioration in mechanical properties of all the factors studied. Author

N83-34052*# Battelle Columbus Labs., Ohio.
ULTRAPURE GLASS OPTICAL WAVEGUIDE: DEVELOPMENT IN MICROGRAVITY BY THE SOL GEL PROCESS Annual Progress Report
Shyama P. Mukherjee, J. C. Debsikdar, and T. Beam 12 Aug. 1983 69 p
(Contract NAS9-34894)
(NASA-CR-170857; NAS 1.26:170857) Avail: NTIS HC A04/MF A01 CSCL 11B

The sol-gel process for the preparation of homogeneous gels in three binary oxide systems was investigated. The glass forming ability of certain compositions in the selected oxide systems (SiO-GeO2, GeO2-PbO, and SiO2-TiO2) were studied based on their potential importance in the design of optical waveguide at longer wavelengths. S.L.

N83-34053*# Boeing Aerospace Co., Seattle, Wash.
EVALUATION OF HIGH TEMPERATURE STRUCTURAL ADHESIVES FOR EXTENDED SERVICE Final Report
S. G. Hill and C. L. Hendricks Hampton, Va. NASA. Langley Research Center Jul. 1983 47 p refs
(Contract NAS1-15605)
(NASA-CR-172163; NAS 1.26:172163) Avail: NTIS HC A03/MF A01 CSCL 11A

The preliminary evaluation of crosslinked polyphenyl quinoxaline (X-PPQ), LARC-TPI, ethyl terminated polysulfone (ETPS), and crosslinked polyimide (X-PI) as adhesives is presented. Lap shear strength stability under thermal, combined thermal/humidity, and stressed and unstressed Skydrol exposure was determined. The X-PPQ, LARC-TPI, and X-PI exhibited good adhesive performance at 505K (450 F) after 1000 hours at 505K. These three polymers also performed well after exposure to combined elevated temperature/high humidity, as well as, to Skydrol while under stress. The ETPS exhibited good ambient temperature adhesive properties, but performed poorly under all other exposure conditions, presumably due to inadequate chain extension and crosslinking. S.L.

N83-34054# Toronto Univ. (Ontario). Inst. for Aerospace Studies.
STUDY OF SPACE ENVIRONMENTAL EFFECTS ON POLYMER MATRIX COMPOSITE MATERIALS Final Report, 1 Nov. 1981 - 31 Oct. 1982
R. C. Tennyson Nov. 1982 199 p refs
(Grant AF-AFOSR-3694-78)
(AD-A126801; AFOSR-83-0199TR) Avail: NTIS HC A09/MF A01 CSCL 11/4

This final report summarizes the research results on space environmental effects including vacuum, temperature, and radiation on the coefficient of thermal expansion (CTE), stiffness, creep, and material damping in graphite/epoxy and Kevlar/epoxy composite laminates, obtained over the period 1 November 1981 to 31 October 1982 under AFOSR-78-3694 funding. This submission is intended to supplement the previous three annual reports and thus should be read in context with those documents. The main accomplishments in this 12 month period have been in the study of UV and electron radiation effects on composites in a thermo-vacuum environment, and the development and experimental validation of viscoelastic and laminate damping models for composites. In hard vacuum, matrix stiffness increases over a wide temperature range, matrix creep compliance and material damping decrease, and CTE changes depending on laminate configuration. B.W.

N83-34055# Israel Ceramic and Silicate Inst., Haifa.
SILICON OXYNITRIDE GLASSES AND GLASS-CERAMICS PREPARATION AND PROPERTIES Final Technical Report, Dec. 1980 - Jan. 1983
R. Abramovici Jan. 1983 41 p refs
(Contract DAJA37-81-C-0022; DA Proj. 1T1-61102-BH-57-04)
(AD-A126780) Avail: NTIS HC A03/MF A01 CSCL 11/2

The change of physical properties of certain glasses and the corresponding glass-ceramics as a consequence of incorporation of nitrogen was studied. Five series of glasses and their crystallized samples of Me-Si-Al-O-N (Me = Li, Ca, Mg, Ca+Mg, Mg+Li) system were prepared and studied. The criteria for selecting the composition within each system were: potential crystalline phases, castability of the melts below 1600 C, and in some cases, solubility of nitrogen in the melts. Nitrogen retention was of 61.7 - 74.2% for glasses melted in air (in covered crucibles) and 79.4 - 90.7% for those melted in nitrogen atmosphere. Glass transition and dilatometric softening temperature, thermal expansion coefficient and microhardness were measured. The crystallized samples were examined also by XRD and SEM. Qualitative observations and the quantitative results showed that the melt viscosity, glass transition and dilatometric softening temperatures as well as the microhardness increase, while the thermal expansion coefficient decreases with the incorporation of nitrogen. The property most strongly influenced the incorporation of nitrogen was the microhardness. The highest microhardness values were found for glasses and crystallized samples in the Ca-Si-Al-O-N system. Author

N83-34056# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Composites, Adhesives and Fibrous Materials Branch.
AN EVALUATION OF AN ACETYLENE TERMINATED SULFONE OLIGOMER Final Report, Jun. 1977 - Dec. 1979
Steven R. Eddy, Amn M. Lucareili, T. Helminiak, W. B. Jones, and L. G. Picklesimer Jan. 1983 18 p refs
(AF Proj. 2419)
(AD-A128071; AFWAL-TR-82-4184) Avail: NTIS HC A02/MF A01 CSCL 07/3

This paper describes the initial characterization and evaluation of a novel acetylene terminated oligomer 4, 4'-bis (3-ethynylphenoxy) diphenylsulfone (ATS). The approach uses a scientific interdisciplinary team concept to generate material properites. The result is an initial characterization of the reactive oligomer (ATS) and the crosslinked polymer that results from its thermal cure. This quantitative characterization includes the consideration of cure rheometry, cure kinetics, volume change, secant modulus, tensile properities, dynamic shear modulus and surface energetics. From the data generated initial material characteristics have been judged to be of sufficient interest to warrant further material development. Of the properites measured, the polymer is noteworthy in its ease of processing, high temperature (177 degrees C and above) mechanical properties, favorable surface properties for moisture resistance, and inherently low moisture pick-up. Author (GRA)

N83-34057# Defence Research Establishment, Ottawa. (Ontario). Energy Conversion Div.
EXPOSURE OF A NITRILE RUBBER TO FUELS OF VARYING AROMATICS LEVEL
J. R. Coleman and L. D. Gallop May 1982 41 p refs
(AD-A128402; DREO-TN-82-26) Avail: NTIS HC A03/MF A01 CSCL 11/1

A nitrile rubber was incubated in fuels to which model aromatic compounds had been added at several levels. Changes in the rubber were determined by standard elastic property determinations after various periods of incubation. The main determinant of attack by the fuel was its aromatic level. Naphthalene was particularly effective in promoting swell and softening, but had about the same effect on elastic properties as mononuclear aromatics at the same level. Cycling of the nitrile rubber between two fuels of considerably different aromatics level degraded tensile properties to a greater extent than did exposure to either fuel alone for the same total period of time. GRA

N83-34058# Cincinnati Univ., Ohio. Dept. of Chemistry.
THEORETICAL STUDIES OF RELATIVELY RIGID POLYMER CHAINS Final Report, 1 Aug. 1978 - 31 Oct. 1982
W. J. Welsh, D. Bhaumik, K. Nayak, and J. E. Mack Dec. 1982 89 p refs
(Grant AF-AFOSR-3683-78; AF Proj. 2303)
(AD-A128421; AFOSR-83-0431TR) Avail: NTIS HC A05/MF A01 CSCL 11/9

Various theoretical approaches were applied to elucidate the structure and properties of rigid rodlike polymer chains which are

of interest as high-performance polymeric materials. First, semi-empirical molecular mechanics methods were used to calculate the intramolecular and intermolecular energies pertinent to conformational flexibility and chain packing effects, and to characterize the rotational flexibility of various molecular swivels which could be inserted into these rodlike chains to facilitate their processing. Second, geometry optimized CND0/2 molecular orbital calculations were carried out to investigate the structure and conformational characteristics of the rodlike polymers and of wholely aromatic swivels, in both the unprotonated and protonated states. Third, several theoretical approaches were used to calculate the molecular polarizabilities of the; rodlike chains and of several analogous aliphatic and aromatic hydrocarbons. Fourth, electronic band gap calculations within the extended Huckel approximation were carried out in both the axial and perpendicular directions to elucidate the packing and electronic properties of these chains in the crystalline state. Some of these same methods were also used to investigate a variety of molecular species possessing structural features similar to those of the rodlike polymers.
Author (GRA)

N83-34059# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COLORLESS OPTICAL GLASS
18 Mar. 1983 38 p Transl. into ENGLISH from Gos. Obshchesoyuznyy Standart 3514-67 (USSR), p 2-27
(AD-A128054; FTD-ID(RS)T-0230-83) Avail: NTIS HC A03/MF A01 CSCL 11/2
The standards for optical colorless inorganic glass in blanks with a diameter (or with greatest side) of no more than 500 mm are presented. Author

N83-34060# Martin Marietta Labs., Baltimore, Md.
VACUUM PYROLYSIS COATINGS FOR CERAMIC ALLOYS Final Report, 27 Jan. 1981 - 26 Jun. 1982
Menachem Natan, Kathleen R. Breen, and John D. Venables Aug. 1982 22 p refs
(Contract N62269-81-C-0219)
(AD-A128823; MML-TR-82-19(C)) Avail: NTIS HC A02/MF A01 CSCL 11/3
The effectiveness of vacuum pyrolysis coatings in improving oxidation resistance and mechanical properties of sintered SIALON substrates was investigated. The substrates were prepared at Martin Marietta Laboratories and the vacuum pyrolysis was performed at NADC by reacting nitrogen gas and hexamethyldisilizane on substrates heated to temperatures between 590 deg C and 710 deg C. No coating was produced at the low temperature. Characterization and mechanical testing of the substrates was performed at Martin Laboratories. The high resolution SEM mode of the STEM was used to determine coating thickness and morphology. The coatings contain silicon, carbon, nitrogen, and oxygen. X-ray diffraction of the coatings revealed no peaks other than those from the substrate, indicating that the coatings may be amorphous. Biaxial flexure testing was performed on coated and uncoated SIALON on samples at two temperatures. In samples exposed to 1400 deg C in air, both coated and uncoated samples show a new X-ray diffraction peak at d = 4.07 A, which corresponds to the 101 peak for low, or alpha, cristobalite (a form of Si02). The relative intensity of this peak is higher for the uncoated samples than the coated samples by a factor of 1.7, indicating that the coatings do impart some oxidation resistance.
GRA

N83-34061# Brookhaven National Lab., Upton, N. Y. Process Sciences Div.
POTENTIAL FOR POLYMER CONCRETE TO CONSERVE ALLOYS IN ENGINEERING APPLICATIONS
Jack J. Fontana Sep. 1982 28 p refs Presented at the Workshop on Trends in Critical Mater. Requirements for Steels of the Future Conservation and Substitution Technol. for Chromium, Nashville, 4-7 Oct. 1982
(Contract DE-AC02-76CH-00016)
(DE83-001312; BNL-31990; CONF-821080-1) Avail: NTIS HC A03/MF A01
The economics of geothermal power presents a real need for the use of functional low cost materials as liners for exposed carbon steel surfaces. Polymer concrete (PC) was identified as a promising liner material. PC is defined as a concrete in which the aggregate is bound in a dense matrix with a polymer binder. Several high temperature PC systems were formulated and tested in the laboratory in brine, flashing brine, and steam at temperatures up to 260 C. Results are also available on field exposures lasting up to 36 months from at least one of six geothermal test sites. Good durability is indicated in all tests. A study indicated that the use of PC liners as a replacement for the corrosion allowance in carbon steel components for a 50 MWe geothermal plant will reduce the cost of electrical generated power by about 6.2 mills per kilowatt hour. DOE

N83-34062# Bendix Corp., Kansas City, Mo.
A METHOD OF PRODUCING DIARYL PHTHALATA SOLID PREPOLYMERS
Yasuo Horio, Teruo Ojima, and Eiji Sakaguchi Dec. 1982 12 p Transl. into ENGLISH of Japanese Patent no. 1963-64,364 (29 Nov. 1963), 1967 3 p
(Contract DE-AC04-76DP-00613)
(DE83-005329; BDX-613-2878) Avail: NTIS HC A02/MF A01
A method of producing a diaryl phthalate solid prepolymer is claimed, characterized in that a diaryl phthalate monomer is polymerized in the presence of a formyl compound and/or carbon tetrachloride until the conversion rate is 50% or more. The prepolymer-monomer mixture is cooled, and when it reaches the solid state, the monomer contained in it is separated using an extraction agent. DOE

N83-34063# Bendix Corp., Kansas City, Mo.
POLYMERIC-FOAM ENCAPSULANTS FOR ELECTRONIC DEVICES
D. J. Fossey and C. H. Smith Nov. 1982 9 p Presented at the 185th Am. Chem. Soc. Natl. Meeting, Seattle, 21-24 Mar. 1983
(Contract DE-AC04-76DP-00613)
(DE83-004139; BDX-613-2866; CONF-830303-8) Avail: NTIS HC A02/MF A01
Different encapsulants for sophisticated electronic packages were developed. Each encapsulant has advantages and disadvantages. The preference of one of these encapsulants to another will require tradeoffs. Syntactic epoxy foams have high strengths, but low densities are not obtainable. The chemically blown epoxy and polyurethane foams have the low-density capability along with lower strengths, compared with syntactic foams. Both the epoxy and polyurethane foams limit the reworkability of the electronic packages. The recently developed polystyrene foam system gives the designer a rework capability but limits the upper use temperature. The service temperature capabilities of some of the electronic components in the package may have to be considered in using the high-temperature polystyrene copolymer foam. Processing temperatures required for this foam system are sufficiently high to possible damage some components in the package. DOE

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N83-34064# Materials Research Labs., Melbourne (Australia).
SENSITIZATION OF HIGH DENSITY SILVER AZIDE TO STAB INITIATION
R. J. Spear, L. D. Redman, and J. R. Bentley May 1983 21 p refs
(MRL-R-881; AR-003-291) Avail: NTIS HC A02/MF A01
The preparation of high density silver azide, bulk density

2.15 g/cubic cm om a free flowing crystalline form is described. Sensitivity data are given and the ability of both energetic and grit sensitizers to sensitize the material to stab initiation was assessed. Some of the grit mixes are very susceptible to explosion during pressing. Experimental compositions based on "L" mix and N.O.L. 130, with LDNR or lead axide/styphnate replace by silver azide and tetrazene by KHADNBF, were studied and show the potential of developing stab and percussion mixes based on silver azide.
Author

N83-34065# Materials Research Labs., Melbourne (Australia).
QUALITATIVE ASSESSMENT OF THE IGNITION OF HIGHLY FLAMMABLE FUELS BY PRIMARY EXPLOSIVES
P. P. Elischer and Leo deYong Jun. 1983 17 p refs
(MRL-R-889; AR-003-302) Avail: NTIS HC A02/MF A01
An assessment of the ignition of fuel/air mixtures and of fabrics soaked with different fuels (ethanol, n-hexane and diethyl ether) by primary explosives has been carried out. Author

N83-34066# Systems Technology Lab., Inc., Arlington, Va.
POST ACCIDENT PROCEDURES FOR CHEMICALS AND PROPELLANTS: GUIDELINES MANUAL Final Report, Apr. 1981 - Jan. 1983
Deborah K. Shaver and Robert L. Berkowitz Edwards AFB, Calif. Air Force Rocket Propulsion Lab. Jan. 1983 246 p refs
(Contract F04611-80-C-0046)
(AD-A126636; AFRPL-TR-82-077) Avail: NTIS HC A11/MF A01 CSCL 21/8
This report presents guidelines for responding to hazardous materials transportation accidents. In particular, guidelines for reporting and accident; initiating the response communications network; first on scene responders; assessing the accident scene; determining the magnitude of the accident and estimating the danger areas from vapor dispersion; containment; vapor suppression; handling leaks; selection of personnel, equipment and materials; firefighting; evacuation; cargo transfer, wreckage removal and cleanup/disposal activities are presented. Author

N83-34067# United Technologies Corp., South Windsor, Conn. Power Systems Div.
EVALUATION OF SYNTHETIC-FUEL CHARACTER EFFECTS ON RICH-LEAN STATIONARY GAS-TURBINE COMBUSTION SYSTEMS. VOLUME 2: FULL-SCALE TEST PROGRAM Final Report, May 1983
P. Russel, G. Beal, J. B. Kennedy, J. B. McVey, and T. J. Rosfjord May 1983 105 p refs Prepared in cooperation with Pratt and Whitney Aircraft Group, West Palm Beach, Fla.
(EPRI Proj. 1898-1)
(DE83-902337; EPRI-AP-2822-Vol-2) Avail: NTIS HC A06/MF A01
The results of the full-scale test effort are described. Full-scale hardware evaluations were conducted to investigate the effect of burner geometric scale on emissions and performance produced by rich-lean combustion systems. Evaluations were conducted using a 10-inch diameter burner, and the results were compared with the results obtained in the subscale effort, which used a similar but smaller (5-inch diameter) burner. Scale effects are of concern in staged, rich-lean combustors because of the suspected critical importance of certain design parameters in translating laboratory performance into commercial hardware performance. Author

N83-34068# Falcon Research and Development Co., Englewood, Colo.
CORRELATION OF FLAMMABILITY TEST DATA ON ANTI-MISTING FUELS Final Report, Aug. 1980 - 1981
Levelle Mahood and Robert L. Talley Atlantic City FAA Dec. 1982 147 p refs
(Contract DTFA03-80-C-0061)
(AD-A127142; DOT/FAA-CT-81/14; FALCON-TR-364010) Avail: NTIS HC A07/MF A01 CSCL 21/4
As a part of a comprehensive FAA program to minimize post-crash fire hazards of jet transport aircraft, a correlation study was conducted on flammability test data of neat Jet A fuel, and the same fuel with various antimisting additives. The data were from full-scale aircraft crash tests, large-scale fuel spillage/ignition tests, and several small-scale flammability tests. Various rheometric tests were also considered. The ability of certain antimisting fuels of eliminate large fireballs during occupant-survivable aircraft crashes was amply supported. Large-scale crash simulations were found to be highly developed, and provide essential credibility on a given antimisting fuel near the end of its development. Small-scale flammability test rigs used for screening antimisting fuels were found generally effective, but with some conflicting data between rigs, and with some deviations from large-scale results.
GRA

N83-34069# Princeton Combustion Research Labs., Inc., N.J.
COMBUSTION OF NITRAMINE PROPELLANTS Final Report
Moshe Ben-Reuven and Martin Summerfield Aberdeen Proving Ground, Md. Army Armament Research and Development Command Mar. 1983 99 p refs
(Contracts DAAK11-80-C-0104; AFOSR-MIPR-81-00004; DA Proj. 1L1-61102-AH-60)
(AD-A126668; ARBRL-CR-00507; PCRL-FR-82-003) Avail: NTIS HC A05/MF A01 CSCL 21/2
The improvement of the physical understanding of cyclic nitramine (RDX, HMX) combustion, through development of a comprehensive analytical model was investigated. Prediction of deflagration rate over a wide pressure range (7-70 MPa), its pressure and temperature sensitivities are outlined, and effective means by which the burning rate can be modified or tailored are indicated. The analysis is divided into two parts. a critical review of existing nitramine combustion models. Particular deficiencies are pointed out, and an improved approximate model is derived; simulation of available HMX burn rate data are performed with both models. Both simple models fail in correlating existing temperature-sensitivity data. In the second part, a comprehensive deflagration model is derived, which incorporates the following elements: nonequilibrium evaporation law at the melt/gas interface, serving as an auxiliary condition to enable independent burn rate prediction; improved melt phase model including decomposition gas bubbles; model for far field processes, with several simultaneous secondary reactions. It is shown that for given (m,Ts) data, the extent of subsurface decomposition decreases appreciably, while the heat feedback to the surface increases, relative to the results of the model excluding bubbles. GRA

N83-34070# Princeton Univ., N. J. Dept. of Chemical Engineering.
A MECHANISTIC STUDY OF NITROMETHANE DECOMPOSITION ON NI CATALYSTS Final Report
Jay Benziger Oct. 1982 20 p refs
(Grant AF-AFOSR-0099-82; AF Proj. 2303)
(AD-A128444; AFOSR-83-0405TR) Avail: NTIS HC A02/MF A01 CSCL 07/3
Nitromethane is one of several compounds which decomposes exothermically and may be used as a monopropellant in small rocket thrusters and demand gas generators. The use of nitromethane for such uses has not received much attention due to the basence of an appropriate catalyst to facilitate its decomposition. The decomposition of nitromethane over NiO and Cr2O3 catalysts was examined to examine the feasibility of a nitro-methane based monopropellant system. It is indicated that a NiO/alumina catalyst is effective in causing nitromethane decomposition. However, relative to existing hydrazine based monopropellant systems the nitromethane-NiO/alumina system suffered two severe drawbacks; first, it required much higher light off temperatures than hydrazine based systems, and second, the decomposition reaction poisoned the catalyst with carbon degrading performance with continued use. GRA

N83-34071# Westinghouse Electric Corp., Golden, Colo. Advanced Systems Technology Div.
REFORMED ALCOHOL FUELS FOR COMBUSTION TURBINES: TECHNICAL AND ECONOMIC FEASIBILITY ASSESSMENT Final Report

N. H. Woodley, D. A. Nordman, J. R. Legro, and D. G. Davies Apr. 1982 57 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-013921; SERI/TR-11290-1) Avail: NTIS HC A04/MF A01

Likely problems and advantages of burning reformed alcohol fuels in combustion turbines are identified. An analysis of the costs of converting new and existing combustion turbines for alcohol fuels is given as well as an economic comparison of various fuel options. DOE

N83-34072# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France). Service Pyrotechnie.
RESEARCH ON THE CHARACTERISTICS OF THE TRHA HIGH TEMPERATURE POWDER Final Report [RECHERCHE DES CARACTERISTIQUES DE LA POUDRE HAUTE TEMPERATURE TRHA]
M. Arnoud Paris ESA 15 Oct. 1982 185 p In FRENCH
(Contract ESTEC-4886/81/NL-AK(SC))
(DGT-21.724; ESA-CR(P)-1751) Avail: NTIS HC A09/MF A01

A theoretical and feasibility study, test procedures and experimental results concerning a high temperature powder for space applications are presented. The powder characteristics considered are the energy per unit weight, the combustion specific volume, the density, combustion temperature, combustion velocity, granularity and ignition facility. Static and dynamic tests were designed and related to existing spacecraft pyrotechnical devices. It is shown that the powders TRHA-A and TRHA-C do not deliver enough energy to activate cable-cutting devices. For other applications the TRHA powder could be used but experimental verification or design changes are required. Author (ESA)

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N83-34073* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
METHOD OF TRACING CONTOUR PATTERNS FOR USE IN MAKING GRADUAL CONTOUR RESIN MATRIX COMPOSITES Patent
Manuel J. Fontes, inventor (to NASA) Issued 31 May 1983 7 p Filed 2 Apr. 1980 Supersedes N80-22410 (18 - 13, p 1680)
(NASA-Case-ARC-11246-1; US-Patent-4,385,949;
US-Patent-Appl-SN-136660; US-Patent-Class-156-59;
US-Patent-Class-156-264; US-Patent-Class-156-344;
US-Patent-Class-273-240; US-Patent-Class-434-88;
US-Patent-Class-434-403) Avail: US Patent and Trademark Office CSCL 13H

The invention relates to methods for making alminate patterns for a resin matrix composite structural component. A sheet of paper is temporarily adhered to a model of the structrual component. A pen is positioned on the paper with a spindle touching the model surface opposite the pen. The pen and spindle are moved along the path that maintains the aforementioned contacts. The resulting line traced on paper is a model constant-thickness locus and provides a pattern for a single lamination of resin-impregnated fabric. The steps are repeated to make other patterns and each time the steps are repeated the distance between the tracer and the spindle is changed to correspond to the thickness of a lamination.
Official Gazette of the U.S. Patent and Trademark Office

N83-34074 National Maritime Inst., Feltham (England).
MEASUREMENT OF WIND FORCES AND MOMENTS ON MODELS OF THREE REPRESENTATIVE HIGH-SPEED MARINE CRAFT
D. E. Walshe Apr. 1983 32 p refs Sponsored by UK Dept. of Industry Marine Technology Committee/Mechanical and Electrical Engineering Requirements Board
(NMI-R-161) Copyright. Avail: Issuing Activity

Measurements of wind forces and moments were made on wind tunnel models of a corvette, a fast patrol craft, and a wide-beam planer to establish the correlation factor between model and full scale test results. The results are presented as values of full scale wind forces and moments per sqm/sec/sec. The variation of forces and moments with yaw angle is given. Results for the planer show that the effects of the spray strakes and vertical fenders are not strongly marked except on the longitudinal (X) lateral (Y) forces at angles of yaw between about 60 and 100 deg; the X forces increase and the Y forces decrease upon removal of the strakes. Author (ESA)

N83-34075# Kyushu Univ., Fukuoka (Japan).
MEMOIRS OF THE FACULTY OF ENGINEERING, KYUSHU UNIVERSITY, VOL. 43, NO. 1
Mar. 1983 138 p refs
(ISSN-0023-6160) Avail: NTIS HC A07/MF A01

A variety of topics in engineering are discussed. A plastic analysis of curved grillage girders is performed. The reflection of waves at perforated and horizontal slit quaywalls with reservoirs is discussed. Post-burnout heat transfer to Freon flowing in a vertical toke at high subcritical pressures and the denitrification rate in the sediments of a highly eutrophic lake are also discussed. R.J.F.

N83-34076# Kyushu Univ., Fukuoka (Japan). Dept. of Civil Engineering.
PLASTIC ANALYSIS OF CURVED GRILLAGE GIRDERS c39
Fujio Imai and Toshiaki Ohta *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 1-8 refs (For primary document see N83-34075 22-31)
Avail: NTIS HC A07/MF A01

Calculation of collapse loads and modes is discussed, as well as plastic deformation for simply supported circular arc grillage girders composed of two main and multiple cross girders with subtended angle from 10 deg to 60 deg and loaded vertically. The final modes of collapse of the grillage girders can be found by using a fully automatic process based on the extended deformation theory. Effects of structural configurations and mechanical properties on collapse loads, modes and deformation are investigated in charts which are available to grillage design. R.J.F.

N83-34077# Kyushu Univ., Fukuoka (Japan). Dept. of Electronics.
INVERTEDLY-BIFURCATING SELF-OSCILLATIONS IN THE MODIFIED HODGKIN-HUXLEY EQUATIONS c64
Kouichi Ryu, Shu Ezaki, and Kiyoshi Toko *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 9-53 refs (For primary document see N83-34075 22-31)
Avail: NTIS HC A07/MF A01

Bifurcation characteristics in the modified Hodgkin-Huxley equations are investigated in detail on the basis of a recently presented theory, which can describe normally bifurcating as well as invertedly bifurcating hard mode instabilities. An algebraic processing computer language was used to get analytic expressions in perturbative calculations up to the fifth order. The present theoretical results can describe well the full bifurcation diagram for the case where normally and invertedly bifurcating instability points coexist closely. It is also shown that the present theory can describe well even an interesting example of the bifurcation diagram which is formed by a single continuous closed branch composed of unstable and stable self oscillations without any instability point. R.J.F.

N83-34078# Kyushu Univ., Fukuoka (Japan). Dept. of Civil Engineering Hydraulics and Soil Mechanics.
NUMERICAL CALCULATIONS OF A CONVECTIVE-DISPERSION EQUATION IN SHEAR FLOW BY METHOD OF SHIFTING PARTICLES c34
Kazuro Momii and Kenji Jinno *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 55-68 refs (For primary document see N83-34075 22-31)

Avail: NTIS HC A07/MF A01

The method of shifting particles is applied to the computations of a convective dispersion equation in a shear flow. The effectiveness of this method is confirmed by the comparisons of numerical results with analytical solutions to the idealized model for turbulent shear flow. Since this method can consider the local variation of velocity in a flow field in the numerical computation, it is concluded that this method can accurately estimate not only the temporal variation of the longitudinal dispersion coefficient but also the spatial distribution of concentration. In addition, the dispersion process in an actual turbulent shear flow is computed. The effects of the viscous sublayer are discussed through these analytical and numerical results. It is concluded that the viscous sublayer offers the principal resistance to diffusion in a turbulent shear flow and the contribution of the viscous sublayer to the longitudinal dispersion coefficient increases with the increase in resistance to diffusion of the viscous sublayer. R.J.F.

N83-34079# Kyushu Univ., Fukuoka (Japan). Dept. of Structural Engineering.

AN EXPERIMENTAL STUDY ON INELASTIC LATERAL-TORSIONAL BUCKLING OF H-SHAPED BEAM-COLUMNS PERMITTED TO SWAY **c39**

Chiaki Matsui, Shosuke Morino, and Junichi Kimura (Fukuoka Univ.) *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 69-85 refs (For primary document see N83-34075 22-31)

Avail: NTIS HC A07/MF A01

The results of the lateral torsional buckling tests of H-shaped steel beam columns under the axial force and the horizontal load, which are carried out to investigate the maximum strength and the inelastic deformation behavior of the beam column permitted to sway are given. The effects of the axial force ratio, the slenderness ratio and the beam to column relative stiffness ratio on the lateral torsional buckling load and the in plane load displacement relations are discussed by comparing the test results with the theoretical findings. The maximum strength of a beam column obtained in the test is generally higher than the theoretical lateral torsional buckling strength. However, the effect of the lateral torsional deformation clearly appears in the grave decrease in the strength of the beam column after the maximum strength is attained. R.J.F.

N83-34080# Kyushu Univ., Fukuoka (Japan). Dept. of Civil Engineering Hydraulics and Soil Mechanics.

REFLECTION OF NORMAL AND OBLIQUE INCIDENT WAVES AT PERFORATED AND HORIZONTAL SLIT QUAYWALLS WITH RESERVOIR **c34**

Hedeaki Okuzono, Akinori Yoshida, and Takeshi Ijima *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 87-108 refs (For primary document see N83-34075 22-31)

Avail: NTIS HC A07/MF A01

Frequency characteristics of reflection coefficients for normal incident waves at perforated quaywall with reservoir are investigated with the results that if the reservoir depth is 0.4 to 1.0 times the water depth in situ and dimensionless frequency sigma squared is 0.3 to 2.0, the reflection coefficient can be depressed low enough by reasonable selection of the porosity and width of perforated wall and the total width of the quaywall. And, to obtain small reflection coefficient, the porosity should be larger and the total width of quaywall should be smaller as the depth in reservoir becomes less. For the analysis of oblique incident wave problems, a method of computation by boundary integral formula is proposed, by which reflection coefficients are computed for simple and composite type perforated or horizontal slit quaywalls and compared with experiments. R.J.F.

N83-34081# Kyushu Univ., Fukuoka (Japan). Power Div.

POST-BURNOUT HEAT TRANSFER TO FREON FLOWING IN A VERTICAL TUBE AT HIGH SUBCRITICAL PRESSURES **c34**

Kaneyasu Nishikawa, Suguru Yoshida, Hideo Mori, and Hiroshi Takamatsu *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 109-132 refs (For primary document see N83-34075 22-31)

Avail: NTIS HC A07/MF A01

Experimental data were obtained of the post burnout heat transfer to Freon 22 flowing upward in a vertical, uniformly heated round tube at high subcritical pressures over a range of reduced pressure from 0.68 to 0.84. Based on an assumed model, the actual quality was estimated from the heat transfer data. The distinctive characteristics of the difference between the vapor mass fraction in thermodynamic equilibrium state and the actual quality were found in the low and high equilibrium quality region respectively. Dimensional correlations of this difference were tentatively obtained. Author

N83-34082# Kyushu Univ., Fukuoka (Japan). Dept. of Chemical Engineering.

DENITRIFICATION RATE IN THE SEDIMENTS OF A HIGHLY EUTROPHIC LAKE **c45**

Mitsutoshi Nakajima, Hajime Nishimura (Tokyo Univ.), and Teruyoshi Hayamizu (Tokyo Univ.) *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 133-139 refs (For primary document see N83-34075 22-31)

Avail: NTIS HC A07/MF A01

The dentrification rate was determined in the core sediments of Lake Teganuma, using the cores under aerobic conditions of overlying waters. The rates of dentriatification and denitritification were 2.0-7.7 and 0.2-3.1 mmol/m squared/d respectively. Nitrogen loss due to denitrification was estimated to be about 3.8 mmol/m squared/d which was 12% of the external load of inorganic nitrogen and 30% of the ammonium liberation rate from the sediments. Vertical distributions of concentrations of nitrate and nitrite in the interstitial water and organic matters in the sediments were investigated. The concentrations of nitrate and nitrite in the nterstitial waters of the sediments were about 2% of those in the overlying water. The average ignition loss, carbon content and nitrogen content were 17.1, 7.75 and 0.86% in the top 10 on sediments. Author

N83-34083# Materials Research Labs., Melbourne (Australia).

PERMEABILITY OF FLEXIBLE MATERIALS USED IN FUEL STORAGE TANKS. PART 1: A METHOD OF MEASUREMENT AND PRELIMINARY RESULTS

Robert J. Mathews Dec. 1982 22 p refs 2 Vol.

(MRL-TN-460; AR-002-747) Avail: NTIS HC A02/MF A01

The permeability of flexible tank fabrics to liquid fuels was determined. The method, which employs a mass spectrometer, enables the permeabilities of fabrics at 20 C and at elevated temperatures to be assessed using a test liquid of 70% iso-octane and 30% toluene. Test results were compared with results obtained using the standard gravimetric method and recommendations were made for future work. Author

N83-34084*# Battelle Columbus Labs., Ohio.

EVALUATION OF FEASIBILITY OF MEASURING EHD FILM THICKNESS ASSOCIATED WITH CRYOGENIC FLUIDS Final Report

J. W. Kannel, T. L. Merriman, R. D. Stockwell, and K. F. Dufrane 26 Aug. 1983 34 p Original contains color illustrations

(Contract NAS8-34908)

(NASA-CR-170865; NAS 1.26:170865) Avail: NTIS HC A03/MF A01 CSCL 20L

The feasibility of measuring elastohydrodynamic (EHD) films as formed with a cryogenic (LN2) fluid is evaluated. Modifications were made to an existing twin disk EHD apparatus to allow for disk lubrication with liquid nitrogen. This disk apparatus is equipped with an X-ray system for measuring the thickness of any lubricant film that is formed between the disks. Several film thickness experiments were conducted with the apparatus which indicate that good lubrication films are filmed with LN2. In addition to the film thickness studies, failure analyses of three bearings were conducted. The HPOTP turbine end bearings had experienced axial loads of 36,000 to 44,000 N (8,000 to 10,000 lb). High continuous radial loads were also experienced, which were most likely caused by thermal growth of the inner race. The resulting

high internal loads caused race spalling and ball wear to occur.
S.L.

N83-34085# Rockwell International Corp., Golden, Colo.
MICROWAVE-HEATING CONTINUOUS DENITRATION APPARATUS
H. Sato, T. Morisue Jan. 1983 8 p refs Transl. into ENGLISH from Japanese Patent no. Sho-56134521 (1981) 8 p
(Contract DE-AC04-76DP-03533)
(DE83-005662; RFP-Trans-354) Avail: NTIS HC A02/MF A01

A denitration apparatus was developed for use in a process for producing a powder of uranium dioxide, plutonium dioxide or their mixture and is to be used as material for the production of nuclear fuel from a solution of uranyl nitrate, plutonium nitrate or their mixture. More specifically, the invention concerns a microwave heating denitration apparatus which causes precipitation of the crystalline powder from the solution, separates the powder and then irradiates it with microwave to cause a temperature rise and a denitration reaction. DOE

N83-34086# Midwest Research Inst., Golden, Colo.
PASSIVE-SOLAR MANUFACTURED BUILDINGS DEVELOPMENT AND ANALYSIS
R. deKieffer, R. Taylor, S. Brant, and D. Simms Jun. 1982 8 p refs Presented at 7th Natl. Passive Solar Conf., Knoxville, Tenn., 29 Aug. 1982
(Contract DE-AC02-77CH-00178)
(DE82-019162; SERI/TP-254-1643; CONF-820819-13) Avail: NTIS HC A02/MF A01

Manufactured passive-solar buildings development and analysis are discussed. Manufactured buildings are quickly becoming the most cost-effective residential and light commercial buildings in the American marketplace. Over the past three years the Solar Energy Research Institute and the Department of Energy worked with building manufacturers to design, develop, and build passive solar manufactured buildings. This development process led to extremely valuable information in design development and design options, cost analysis, and estimated and monitored thermal performance on all types of manufactured buildings. Because of the tight cost/marketing restrictions in this industry, the lessons learned in this program are beneficial to all sections of the design and building community. The scope and content of this data is described by using a case study developed for the program. DOE

N83-34087# Los Alamos Scientific Lab., N. Mex.
THEORY OF AN ACTIVE MAGNETIC REGENERATIVE REFRIGERATOR
J. A. Barclay 1982 15 p refs Presented at 2nd Biennial Conf. on Refrig. for Cryogen. Sensors and Electron. Systems, Greenbelt, Md., 7 Dec. 1982
(Contract W-7405-eng-36)
(DE83-011184; LA-UR-83-1251; CONF-821237-1) Avail: NTIS HC A02/MF A01

The adiabatic temperature change with field which is limited to about 2 K/Tesla for ferromagnets near their Curie temperatures by the change of magnetization with temperature and the lattice heat capacity is discussed. Practical magnetic refrigerators operate on a regenerative cycle such as the Brayton cycle. One way to execute this cycle is through the use of an active magnetic regenerator, i.e. a regenerator composed of magnetic material that is cycled in an out of a magnetic field with appropriate fluid flows. The theory of these devices is predicted by solving the partial differential equations that describe fluid and the magnetic solid. The active magnetic regenerator is described along with the method of calculation. Temperature profiles for a normal regenerator and a magnetic regenerative refrigerator are shown. DOE

N83-34088# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.
LIQUID-VAPOR PHASE SEPARATOR FOR A CRYOGENIC LIQUID IN A ZERO G ENVIRONMENT. PART A: EXECUTIVE SUMMARY Final Report
Paris ESA 7 Oct. 1982 50 p 3 Vol.
(Contract ESTEC-4596/81/NL-AL)
(MBB-UR-571/82-Vol-1; ESA-CR(P)-1750-Vol-1) Avail: NTIS HC A03/MF A01

A phase separator was investigated with the main application to liquid hydrogen. Nineteen concepts were considered and one basic concept was selected for further detailed study and experimental demonstration of its feasibility. The system selected is the constant pressure heat exchanger phase separator system. Liquid or gaseous or mixed phase hydrogen is released from the H2-tank by a discontinually operating tank exit valve. The H2 is then throttled to a lower constant pressure level and cooled to a lower than the bulk tank temperature. The throttled and cooled hydrogen is in heat exchange with the warmer tank by coils attached to the tank. Hydrogen pressure is maintained within a specified band width. The tank exit valve is controlled by an electronic control unit connected with a tank pressure sensor. The pressure inside the heat exchanger is maintained constant and lower than the tank pressure by a relief-type system exit valve which is arranged at the warm outlet end of the cryogenic cooling system. All hydrogen entering the heat exchanger is completely evaporated there, thus preventing any liquid H2 from exiting the system. Author (ESA)

N83-34089# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.
LIQUID-VAPOR PHASE SEPARATOR FOR A CRYOGENIC LIQUID IN A ZERO G ENVIRONMENT. PART B: TECHNICAL WORK Final Report
Paris ESA 7 Oct. 1982 133 p refs 3 Vol.
(Contract ESTEC-4596/81/NL-AK)
(MBB-UR-571/82-Vol-2; ESA-CR(P)-1750-Vol-2) Avail: NTIS HC A07/MF A01

A phase separator was investigated with the main application to liquid hydrogen. Nineteen concepts were considered and one basic concept was selected for further detailed study and experimental demonstration of its feasibility. The system selected is the constant pressure heat exchanger phase separator system. Liquid or gaseous or mixed phase hydrogen is released from the H2-tank by a discontinually operating tank exit valve. The H2 is then throttled to a lower constant pressure level and cooled to a lower than the bulk tank temperature. The throttled and cooled hydrogen is in heat exchange with the warmer tank by coils attached to the tank. Hydrogen pressure is maintained within a specified band width. The tank exit valve is controlled by an electronic control unit connected with a tank pressure sensor. The pressure inside the heat exchanger is maintained constant and lower than the tank pressure by a relief-type system exit valve which is arranged at the warm outlet end of the cryogenic cooling system. All hydrogen entering the heat exchanger is completely evaporated there, thus preventing any liquid H2 from exiting the system. Author (ESA)

N83-34090# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.
LIQUID-VAPOR PHASE SEPARATOR FOR A CRYOGENIC LIQUID IN A ZERO G ENVIRONMENT. PART C: PRELIMINARY PHASE SEPARATOR SYSTEM SPECIFICATION Final Report
Paris ESA 7 Oct. 1982 22 p 3 Vol.
(Contract ESTEC-4596/81/NL-AK)
(MBB-UR-571/82-Vol-3; ESA-CR(P)-1750-Vol-3) Avail: NTIS HC A02/MF A01

A phase separator was investigated with the main application to liquid hydrogen. Nineteen concepts were considered and one basic concept was selected for further detailed study and experimental demonstration of its feasibility. The system selected is the constant pressure heat exchanger phase separator system. Liquid or gaseous or mixed phase hydrogen is released from the H2-tank by a discontinually operating tank exit valve. The H2 is then throttled to a lower constant pressure level and cooled to a lower than the bulk tank temperature. The throttled and cooled hydrogen is in heat exchange with the warmer tank by coils attached to the tank. Hydrogen pressure is maintained within a specified band width. The tank exit valve is controlled by an

electronic control unit connected with a tank pressure sensor. The pressure inside the heat exchanger is maintained constant and lower than the tank pressure by a relief-type system exit valve which is arranged at the warm outlet end of the cryogenic cooling system. All hydrogen entering the heat exchanger is completely evaporated there, thus preventing any liquid H2 from exiting the system. Author (ESA)

N83-34091# Sheffield Univ. (England). Dept. of Control Engineering.
PRECOMPENSATION, APPROXIMATION AND AN INVERSE NYQUIST ARRAY DESIGN TECHNIQUE USING PLANT STEP DATA ONLY
D. H. Owens and A. Chotai Feb. 1983 36 p refs
(RR-214; Grant SRC-GR/B/23250) Avail: NTIS HC A03/MF A01

Given a multivariable plant with uncertain or unknown dynamics, the use of step response data in control design is described based upon a simple diagonal model of a precompensated plant. The technique is identical in structure to the inverse Nyquist array design technique with Gershgorin circles replaced by confidence circles deduced from simple graphical operations on plant step data. At no stage is a plant model required. The choice of constant precompensator and simplified model by iterative means is described as a sequence of dual optimization problems. Author (ESA)

N83-34092# Sheffield Univ. (England). Dept. of Control Engineering.
LOAD-CONTROL OF A 300 hp TUNNELLING MACHINE
J. B. Edwards Apr. 1983 23 p refs
(Contract NCB-226072)
(RR-220) Avail: NTIS HC A02/MF A01

A mathematical model is derived for the rock cutting operation of a tunnelling machine used in a coal mine. The existing over-riding load control system is shown to produce oscillatory load patterns when cutting harder rock, that accord closely with preliminary observations underground. The model is used to design and confirm the performance of a load control system using derivative power feedback. Modifications to the existing control amplifier are straightforward. Author (ESA)

N83-34093# Oxford Univ. (England). Dept. of Engineering Science.
THE APPLICATION OF SELF-TUNING CONTROL
D. W. Clarke 1983 38 p refs
(OUEL-1478/83) Avail: NTIS HC A03/MF A01

The use of predictive control laws is explored in the nonadaptive context in which the closed loop response, the control input behavior, and the response to load disturbances can be individually tailored by the user. This is contrasted with the usual tuning of PID coefficients based on the subjective evaluation of control performance. The role of adaptation is discussed in terms of its applications, for example for commissioning fixed controllers or for keeping a critical loop tightly tuned. Pitfalls in applying adaptive control are outlined, and alternatives to the approach based on discrete time predictor theory are mentioned. Author (ESA)

N83-34094# Cambridge Univ. (England). Dept. of Engineering.
CHOICE OF MODELS FOR GEOTECHNICAL PREDICTIONS
D. M. Wood 1982 33 p refs
(PB83-187393; CUED/D-SOILS-TR-126-1982; ISSN-0309-7439)
Avail: NTIS HC A03/MF A01 CSCL 20K

The stress path approach in identifying critical soil elements in association with a variety of geotechnical structures is discussed. The following situations were discussed: the stress path on a soil element on the centerline beneath a circular load; the stress path for an element behind a retaining wall; for elements adjacent to an excavation; for elements beneath a long embankment; and for elements adjacent to a pile or pressure meter. The essential features of Cam clay models, exemplifying a series of simple elastic models, were described. However, since this model is not always successful in matching this observed experimental path, it was suggested that caution should be exercised in making geotechnical predictions which involve extrapolation into a region outside the premises of the model. GRA

N83-34095# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
BEHAVIOUR OF SHORT CRACKS IN AIRFRAME COMPONENTS
Loughton, England Apr. 1983 203 p refs Meeting held in Toronto, 19-24 Sep. 1982
(AGARD-CP-328; ISBN-92-835-1444-0) Avail: NTIS HC A10/MF A01

The accuracy and applicability of methods based on linear elastic fracture mechanics currently available for predicting short crack behavior are discussed. Emphasis is on the behavior of short cracks in airframe components. R.J.F.

N83-34096# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
MECHANICS AND PHYSICS OF THE GROWTH OF SMALL CRACKS **c39**
R. O. Ritchie and S. Suresh *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 14 p refs (For primary document see N83-34095 22-31)
(Grant AF-AFOSR-0181-82)
Avail: NTIS HC A10/MF A01

The mechanics and physics of the subcritical propagation of small fatigue cracks are reviewed in terms of reported differences in behavior between long and short flaws based on fracture mechanics, microstructural and environmental viewpoints. Cracks are considered short when their length is small compared to relevant microstructural dimensions (a continuum mechanics limitation), when their length is small compared to the scale of local plasticity (a linear elastic fracture mechanics limitation), and when they are merely physically small (e.g., < 0.5-1 mm). For all three cases, it is shown that, at the same nominal driving force, the growth rates of the short flaws are likely to be greater than (or at least equal to) the corresponding growth rates of long flaws; a situation which can lead to nonconservative defect tolerant lifetime predictions where existing (long crack) data are utilized. Reasons for this problem of similitude between long and short flaw behavior are discussed in terms of the roles of crack driving force, local plasticity, microstructure, crack shape, crack extension mechanism, premature closure of the crack, and local crack tip environment. Author

N83-34097# Saskatchewan Univ., Saskatoon. Dept. of Mechanical Engineering.
FATIGUE DAMAGE MECHANISMS AND SHORT CRACK GROWTH **c39**
I. LeMay *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 11 p refs Sponsored by Natural Science and Engineering Research Council of Canada (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

The growth of short fatigue cracks, where the Paris law does not appear to hold, is discussed. In this regime the mechanisms of fatigue damage are of importance to an understanding of the role of microstructure in affecting growth rate. The operative mechanisms and their effect on short crack growth are reviewed. R.J.F.

N83-34098# Ministry of Defence, Harefield (England). Directorate of Future Systems.
AN ASSESSMENT OF THE IMPORTANCE OF SMALL CRACK GROWTH TO AIRCRAFT DESIGN **c05**
R. F. W. Anstee *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 9 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

The application of small crack propagation data to the design of aircraft structures is discussed. No deliberate attempt is made to cover peculiarities of engine construction. It is intended to

generate a questioning attitude to exactly how small crack data will be applied and to what benefit. It is concluded that cracks do not greatly affect either inspection periodicity or total fatigue life of aircraft designed to current design specification rules. The application of small crack data is confined to only a few design conditions. The MIL 83444 may well account for small crack effects in the way the durability crack size was derived. A more accurate understanding of small crack growth behavior applied to propagation calculations should also be applied to a revision of the MIL Spec derivation, which would result in the same cycle count to attain the long crack condition as the present specification would demand. Benefits in the understanding of the fatigue process are likely to be developed from small crack investigations. Potentially large benefits in life cycle costs could be derived from an improved understanding of fatigue. Accurate interpretation of small crack behavior will depend upon a number of advances in experiment and analysis. Such advances are unlikely to come about without a deliberate attempt to bring together the component parts in a well designed and properly progressed investigation. R.J.F.

N83-34099# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

USE OF SMALL CRACK DATA TO BRING ABOUT AND QUANTIFY IMPROVEMENTS TO AIRCRAFT STRUCTURAL INTEGRITY **c05**

J. M. Potter and B. G. W. Yee (General Dynamics Corp., Fort Worth, Tex.) *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 13 p refs (For primary document see N83-34095 22-31)

Avail: NTIS HC A10/MF A01

The general procedures used in the derivation of small crack data are described and growth data for different structural manufacturing methods are presented. The data will be presented in terms of equivalent initial flaw size populations, crack growth rate, and initiation life to a specific length for fractographically measured cracks within the range of .01 to 1 millimeter in length. Procedures to utilize the small crack data for developing and verifying changes in fastener systems and manufacturing methods for improving the fatigue performance of aircraft structures are discussed. R.J.F.

N83-34100*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

A NONLINEAR FRACTURE MECHANICS APPROACH TO THE GROWTH OF SMALL CRACKS **c39**

J. C. Newman, Jr. *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 26 p refs (For primary document see N83-34095 22-31)

Avail: NTIS HC A10/MF A01 CSCL 20K

An analytical model of crack closure is used to study the crack growth and closure behavior of small cracks in plates and at notches. The calculated crack opening stresses for small and large cracks, together with elastic and elastic plastic fracture mechanics analyses, are used to correlate crack growth rate data. At equivalent elastic stress intensity factor levels, calculations predict that small cracks in plates and at notches should grow faster than large cracks because the applied stress needed to open a small crack is less than that needed to open a large crack. These predictions agree with observed trends in test data. The calculations from the model also imply that many of the stress intensity factor thresholds that are developed in tests with large cracks and with load reduction schemes do not apply to the growth of small cracks. The current calculations are based upon continuum mechanics principles and, thus, some crack size and grain structure exist where the underlying fracture mechanics assumptions become invalid because of material inhomogeneity (grains, inclusions, etc.). Admittedly, much more effort is needed to develop the mechanics of a noncontinuum. Nevertheless, these results indicate the importance of crack closure in predicting the growth of small cracks from large crack data. R.J.F.

N83-34101# Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany).

DAMAGE TOLERANCE EVALUATION OF STRUCTURES WITH SMALL CRACKS **c39**

Lueder Schwarmann *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 6 p refs (For primary document see N83-34095 22-31)

Avail: NTIS HC A10/MF A01

Two different methods for damage tolerance evaluation of airframe structures with small cracks are investigated. These methods are: by through the thickness cracks emanating from a circular hole and by semielliptical surface cracks. Both methods give sufficient results as far as the comparison with corresponding test results is concerned. Therefore both methods are recommended for practical applications in aircraft design concerning damage tolerance evaluation. A cracked pin loaded hole is the most critical crack configuration, especially for small cracks, as compared with other cases. Therefore the degree of pin load, i.e., the load transfer by a bolt or by a rivet, has to be determined very thoroughly in order to avoid overestimations of the damage tolerance performance of the airframe structure. Analyses based on through cracked configurations are pessimistic as compared with surface cracked configurations and should therefore be the first (safe) step of damage tolerance evaluation procedure. R.J.F.

N83-34102# Royal Aircraft Establishment, Farnborough (England).

FRACTURE MECHANICS ANALYSIS OF SHORT CRACKS AT LOADED HOLES **c39**

D. P. Rooke *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 6 p refs (For primary document see N83-34095 22-31)

Avail: NTIS HC A10/MF A01

In a pedominantly tensile field the time for a fatigue crack to grow to a critical length is dominated by the time spent when the crack is short. Cracks frequently start in the vicinity of a stress concentrator such as a hole, and the stress intensity factor which controls crack growth rate is largely determined by the local stress field. If the hole is loaded on its perimeter, the stress intensity factor for short cracks is strongly dependent on the actual distribution of load on the perimeter. In a cracked pin loaded lug load is, in general, transmitted from the pin to the lug by both normal and shear forces; the shear forces arise from the friction (fretting) between the pin and the lug. It is shown, by using a Green's function technique, that the presence of friction increases the stress intensity factor and hence increases the rate of growth of fatigue cracks which reduces the fatigue lifetime. The magnitude of these effects depends on the coefficient of friction and how it varies around the hole. Author

N83-34103# Nationaal Lucht-en Ruimtevaartlaboratorium, Amsterdam (Netherlands).

LIFETIME PREDICTION METHODS FOR CORNER CRACKS AT HOLES **c39**

C. J. Lof *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 9 p refs (For primary document see N83-34095 22-31)

Avail: NTIS HC A10/MF A01

An application of linear elastic fracture mechanics to 3 dimensional crack growth prediction was developed in two phases. In the first phase finite element techniques for accurate stress intensity (S.I.) calculation were evaluated. The process of corner flaw growth during constant amplitude fatigue load was studied. The development of cracks in size and shape as a function of calculated instantaneous S.I. distributions along the crack boundary was investigated. Lifetime predictions concerning critical crack size are made. R.J.F.

N83-34104# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

PROBABILISTIC FRACTURE MECHANICS ANALYSIS METHODS FOR STRUCTURAL DURABILITY **c39**

James L. Rudd, Jann N. Yang (George Washington Univ., Washington, D.C.), Sherrell K. Manning (General Dynamics Corp., Fort Worth, Tex.), and Bill G. W. Yee (General Dynamics Corp., Fort Worth, Tex.) *In* AGARD Behaviour of Short Cracks in Airframe

Components Apr. 1983 23 p refs (For primary document see N83-34095 22-31)
(Contract F33615-77-C-3123)
Avail: NTIS HC A10/MF A01

The United States Air Force requires that Air Force aircraft be designed to be durable. This requirement necessitates an analytical demonstration that excessive cracking within the airframe will not occur during the aircraft's design service life. In order to predict the time at which excessive cracking occurs, an analysis is needed which is capable of predicting the distribution of crack sizes within the airframe at any point in time. Such an analysis was recently developed and is presented in this paper. The durability analysis is based on a fracture mechanics philosophy, combining a probabilistic format with a deterministic crack growth rate relationship. Essential elements of the methodology are presented, with emphasis on the statistical representation of the initial fatigue quality of the structure. The accuracy of the durability analysis is demonstrated by correlation analytical predictions with experimental results of a fighter full-scale test article as well as complex-splice specimens subjected to a bomber load spectrum. Author

N83-34105# Waterloo Univ. (Ontario).
THE EFFECTS OF COMPRESSIVE OVERLOADS ON THE THRESHOLD STRESS INTENSITY FOR SHORT CRACKS c39
P. Au, T. H. Topper, and M. L. ElHaddad *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 7 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

Fatigue tests of smooth and notched specimens in which stress levels are relatively high and most of the fatigue life is spent at short crack lengths, have shown that the compressive as well as the tensile part at a load cycle causes fatigue damage and that overloads significantly reduce fatigue life. Crack propagation tests using longer cracks and lower stress levels have, on the other hand, indicated that the compressive part of the load cycle has little effect on crack growth and that tensile overloads are benefitical and delay crack growth. In the present investigation, crack propagation specimens of an aluminum alloy are subjected to continuous and periodic cycles having compressive stresses. Results indicate that for a tension compression load cycle crack growth in the near threshold regime is controlled by the tensile peak stress intensity and the compressive peak stress. Compressive loading significantly reduces the threshold intensity and increases crack growth rate. Furthermore, periodic application of compressive overloads during zero to maximum stress intensity tests is shown to drastically reduce the threshold stress intensity for thousands of cycles following each overload application. Author

N83-34106# Royal Aircraft Establishment, Farnborough (England). Materials and Structures Dept.
CRACK PROPAGATION AT SHORT CRACK LENGTHS UNDER VARIABLE AMPLITUDE LOADING c39
R. Cook and P. R. Edwards *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 19 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

An experimental program was carried out to investigate short crack anomalies whereby short cracks propagate faster than long cracks at the same calculated stress intensity factor. This paper is the second to be issued on this program and contains all results to date. Fatigue tests were carried out on notched 2L65 aluminium alloy specimens under constant and variable amplitude loading. Measurements of corner cracks growing from holes were taken down to crack lengths of 0.01mm using replicas. Under constant amplitude loading short crack anomalies were identified at zero mean stress but not at R=0 (zero to peak) loading. Under Gaussian random loading much greater anomalies were identified. A linear summation of constant amplitude crack rates to predict those under Gaussian random loading gave predictions that were too slow at short crack lengths and too fast at longer crack lengths. B.W.

N83-34107# Wisconsin Univ., Madison.
SPECTRUM EFFECTS ON THE GROWTH OF SHORT CRACKS
B. I. Sandor, D. A. Haas, and T. Ozakat *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 7 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

Several phenomena are discussed concerning creep-fatigue effects on crack initiation and propagation in notched 7075-T651 aluminum at room temperature. Background data show complete creep ruptures of smooth specimens in a time of 106 s at stresses about equal to the yield strength. Creep rate under a constant load decreases in the first half of the life and increases in the second half. In notched specimens (K sub + = 5) tensile overloads with hold times result in additional extensions of the fatigue life beyond that of brief overloads. Additional extensions in life are 33%, 44%, and 55%, for 100% initial overloads with hold times of 100,100 s, 1,000 s and 10,000 s, respectively. In specimens with part-through short cracks, the overload causes no crack extension, and it temporarily decreases the fatigue crack propagation rate. In specimens with through short cracks, the overload causes a distinct tunneling rupture during hold times of 100 s and 500 s, and a temporary retardation of the fatigue crack propagation rate. Author

N83-34108# Douglas Aircraft Co., Inc., Long Beach, Calif.
A STUDY OF SMALL CRACK GROWTH UNDER TRANSPORT SPECTRUM LOADING c39
D. Y. Wang *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 15 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

This paper describes a study of microcrack growth and statistical fatigue in terms of the initial quality of fastener holes in aluminum alloy. A special test procedure was used to obtain a statisticaly large sample of data under spectrum loading by testing a specimen containing 24 holes with maximum of 48 fatigue data sets. A total of seven specimens was tested. Small crack measurements were taken by fractography and surface observation. Marker cycles, which were designed to be part of the spectrum, served the intended purpose of identifying crack origin and microcrack growth rates using a scanning electron microscope. The phenomena of small crack growth have been analyzed from the extensive data. The essential physical defects in 2024-T3 and 7075-T6 aluminum alloys as origins of microfatigue cracking are the inclusions and tool marks. Author

N83-34109# Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn (West Germany).
SMALL CRACKS IN LARGE FORGINGS c39
Walter Schuetz *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 17 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

The feasibility of producing large steel forgings for steam turbine rotors without flaws is discussed. The behavior of flaws under typical service stress was analyzed. The propagation of flaws was studied. The accuracy of the size of flaws in the interior of large forgings indicated by ultrasonics was also studied. B.W.

N83-34110# Battelle Memorial Inst., Columbus, Ohio.
DISCUSSION OF THE SHORT CRACK EFFECT IN AIRFRAME MATERIALS AND COMPONENTS c05
Brian Leis *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 12 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

This meeting has brought together a number of diverse interests, each with a different perspective on what a short crack is. The literature relevant to the short effect suggests that a short crack is any crack is any crack whose growth can't be correlated with handbook growth rate data using fracture mechanics technology, specifically linear elastic fracture mechanics (LEFM). The short crack effect is of interest to alloy designers because it may be a

key to improving materials in the future. It is of interest to the scientist because it does not follow the commonly used analysis framework of LEFM. But most importantly for AGARD, it is of concern to the engineer in that the short crack literature indicates LEFM predictions of growth rate (when integrated crack size), inspection interval, and possibly critical crack size are often nonconservative in the presence of this effect. The engineer can avoid the problems associated with the short crack effect by careful consideration of the key assumption he makes in applying LEFM. The key assumption is that equal changes in the value of the stress intensity factor mean equal amounts of crack advance (equal crack driving force). That is, the concept of similitude is invoked. On the surface, the concept of similitude is straightforward - however, its implementation in practical situations related to LEFM is not 1. As detailed in a recent report, a breakdown in the similitude concept is central to the apparent short crack effect. The following summarizes the central issues related to similitude are discussed. B.W.

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N83-34111 British Broadcasting Corp., Kingswood (England). Engineering Div.
DIGITAL TELEVISION TRANSMISSION: THE 34 Mbit/s PAL INVESTIGATION
P. A. Ratliff Jul. 1983 18 p refs
(BBC-RD-1983/9) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

The use of digital techniques for transmission has well known advantages. However, transmission of video signals in digital form is economically attractive unless bit rate reduction methods are used. Suitable methods are reviewed and three of them discussed in greater detail. The use of these methods is illustrated by the description of a system which conveys a broadcast quality video signal, together with two high quality sound signals and other ancillary services, within a total bit rate of 34 Mbit/s. Author

N83-34112*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRELIMINARY DESIGN OF 19-ELEMENT FEED CLUSTER FOR A LARGE F/D REFLECTOR ANTENNA
M. C. Bailey Aug. 1983 24 p refs
(NASA-TM-85666; NAS 1.15:85666) Avail: NTIS HC A02/MF A01 CSCL 09C

The design of a low sidelobe 19 element microstrip cluster and its distribution network is described. The problem of spillover illumination of an adjacent reflector in a multiple aperture reflector system is addressed. A practical implementation of the array is presented which requires only one printed circuit board for the distribution network with the potential for being easily tailored to a wide range of excitation distributions. Author

N83-34113*# Western Union Telegraph Co., McLean, Va. Government Systems Div.
SATELLITE PROVIDED FIXED COMMUNICATION SERVICES: A FORECAST OF POTENTIAL DOMESTIC DEMAND THROUGH THE YEAR 2000. VOLUME 1: EXECUTIVE SUMMARY Final Report
D. Kratochvil, J. Bowyer, C. Bhushan, K. Steinnagel, D. Kaushal, and G. Al-Kinani Aug. 1983 41 p refs 3 Vol.
(Contract NAS3-22894)
(NASA-CR-168145; NAS 1.26:168145) Avail: NTIS HC A03/MF A01 CSCL 17B

Telecommunications service demand, net addressable forecast, capacity requirements, and satellite system market development are considered. Author

N83-34114*# Western Union Telegraph Co., McLean, Va. Government Services Div.
SATELLITE PROVIDED FIXED COMMUNICATIONS SERVICES: A FORECAST OF POTENTIAL DOMESTIC DEMAND THROUGH THE YEAR 2000: VOLUME 2: MAIN TEST Final Report
D. Kratochvil, J. Bowyer, and C. Bhushan Aug. 1983 208 p refs 3 Vol.
(Contract NAS3-22894)
(NASA-CR-168146; NAS 1.26:168146) Avail: NTIS HC A10/MF A01 CSCL 17B

Potential satellite-provided fixed communications services, baseline forecasts, net long haul forecasts, cost analysis, net addressable forecasts, capacity requirements, and satellite system market development are considered. Author

N83-34115*# Western Union Telegraph Co., McLean, Va. Government Systems Div.
SATELLITE FIXED COMMUNICATIONS SERVICE: A FORECAST OF POTENTIAL DOMESTIC DEMAND THROUGH THE YEAR 2000. VOLUME 3: APPENDICES Final Report
D. Kratochvil, J. Bowyer, and C. Bhushan 14 Sep. 1983 417 p refs 3 Vol.
(Contract NAS3-22894)
(NASA-CR-168147; NAS 1.26:168147) Avail: NTIS HC A18/MF A01 CSCL 17B

Voice applications, data applications, video applications, impacted baseline forecasts, market distribution model, net long haul forecasts, trunking earth station definition and costs, trunking space segment cost, trunking entrance/exit links, trunking network costs and crossover distances with terrestrial tariffs, net addressable forecasts, capacity requirements, improving spectrum utilization, satellite system market development, and the 30/20 net accessible market are considered. Author

N83-34116*# Western Union Telegraph Co., McLean, Va. Government Systems Div.
SATELLITE PROVIDED CUSTOMER PREMISES SERVICES: A FORECAST OF POTENTIAL DOMESTIC DEMAND THROUGH THE YEAR 2000. VOLUME: EXECUTIVE SUMMARY Final Report
D. Kratochvil, J. Bowyer, C. Bhushan, K. Steinnagel, D. Kaushal, and G. Al-Kinani Aug. 1983 46 p refs 3 Vol.
(Contract NAS3-23255)
(NASA-CR-168142; NAS 1.26:168142) Avail: NTIS HC A03/MF A01 CSCL 17B

Development of a forecast of the total domestic telecommunications demand, identification of that portion of the telecommunications demand suitable for transmission by satellite systems, identification of that portion of the satellite market addressable by CPS systems, identification of that portion of the satellite market addressable by Ka-band CPS system, and postulation of a Ka-band CPS network on a nationwide and local level were achieved. The approach employed included the use of a variety of forecasting models, a parametric cost model, a market distribution model and a network optimization model. Forecasts were developed for: 1980, 1990, 2000; voice, data and video services; terrestrial and satellite delivery modes; and C, Ku and Ka-bands. Author

N83-34117*# Western Union Telegraph Co., McLean, Va. Government Systems Div.
SATELLITE PROVIDED CUSTOMER PREMISE SERVICES: A FORECAST OF POTENTIAL DOMESTIC DEMAND THROUGH THE YEAR 2000. VOLUME 2: TECHNICAL REPORT Final Report
Aug. 1983 315 p refs 3 Vol.
(Contract NAS3-23255)
(NASA-CR-168143; NAS 1.26:168143) Avail: NTIS HC A13/MF A01 CSCL 17B

The potential United States domestic telecommunications demand for satellite provided customer premises voice, data and

video services through the year 2000 were forecast, so that this information on service demand would be available to aid in NASA program planning. To accomplish this overall purpose the following objectives were achieved: development of a forecast of the total domestic telecommunicatons demand, identification of that portion of the telecommunications demand suitable for transmission by satellite systems, identification of that portion of the satellite market addressable by Computer premises services systems, identification of that portion of the satellite market addressabble by Ka-band CPS system, and postulation of a Ka-band CPS network on a nationwide and local level. The approach employed included the use of a variety of forecasting models, a market distribution model and a network optimization model. Forecasts were developed for; 1980, 1990, and 2000; voice, data and video services; terrestrial and satellite delivery modes; and C, Ku and Ka-bands. Author

N83-34118*# Western Union Telegraph Co., McLean, Va. Governmet Systems Div.
SATELLITE PROVIDED CUSTOMER PREMISE SERVICES: A FORECAST OF POTENTIAL DOMESTIC DEMAND THROUGH THE YEAR 2000. VOLUME 3: APPENDICES Final Report
D. Kratochvil, J. Bowyer, C. Brushan, K. Steinnagel, D. Kaushal, and G. Al-Kinani Aug. 1983 675 p refs 3 Vol.
(Contract NAS3-23255)
(NASA-CR-168144; NAS 1.26:168144) Avail: NTIS HC A99/MF A01 CSCL 17B

Voice applications, data applications, video applications, impacted baseline forecasts, market distribution, potential CPS (customers premises services) user classes, net long haul forecasts, CPS cost analysis, overall satellite forecast, CPS satellite market, Ka-band CPS satellite forecast, nationwide traffic distribution model, and intra-urban topology are discussed. Author

N83-34119*# General Electric Co., Schenectady, N. Y. Corporate Research and Development.
MOBILE RADIO ALTERNATIVE SYSTEMS STUDY, EXECUTIVE SUMMARY Final Report
Roy E. Anderson, Norman Cromwell, and Howard L. Lester Jun. 1983 41 p
(Contract NAS3-23244)
(NASA-CR-168207; NAS 1.26:168207; Rept-83SRD038) Avail: NTIS HC A03/MF A01 CSCL 17B

Present day mobile communication technologies, systems and equipment are described from background in evaluating the concepts generated in the study. Average propagation ranges are calculated for terrestrial installations in each of seven physiographic areas of the contiguous states to determine the number of installations that would be required for nationwide coverage. Four system concepts are defined and analyzed to determine how well terrestrial systems can fulfill the requirements at acceptable costs. Author

N83-34120*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A COMPARISON OF FREQUENCY DOMAIN MULTIPLE ACCESS (FDMA) AND TIME DOMAIN MULTIPLE ACCESS (TDMA) APPROACHES TO SATELLITE SERVICE FOR LOW DATA RATE EARTH STATIONS
Grady Stevens Jun. 1983 54 p refs
(NASA-TM-83430; E-1721; NAS 1.15:83430) Avail: NTIS HC A04/MF A01 CSCL 17B

A technological and economic assessment is made of providing low data rate service to small earth stations by satellite at Ka-band. Various Frequency Domain Multiple Access (FDMA) and Time Domain Multiple Access (TDMA) scenarios are examined and compared on the basis of cost to the end user. Very small stations (1 to 2 meters in diameter) are found not to be viable alternatives to available terrestrial services. However, medium size (3 to 5 meters) earth stations appear to be very competitive if a minimum throughput of about 1.5 Mbs is maintained. This constrains the use of such terminals to large users and shared use by smaller users. No advantage was found to the use of FDMA. TDMA had a slight advantage from a total system viewpoint and a very significant advantage in the space segment (about 1/3 the required payload weight for an equivalent capacity). Author

N83-34121*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
PRELIMINARY DESIGN OF A 15 M DIAMETER MECHANICALLY SCANNED DEPLOYABLE OFFSET ANTENNA Final Report
[1983] 69 p
(Contract NAS5-26495)
(NASA-CR-170573; NAS 1.26:170573; LMSC-D714659) Avail: NTIS HC A04/MF A01 CSCL 20N

The preliminary design of a 15 meter diameter mechanically scanned, offset rotating, fed parabolic reflector antenna system is reported and the results of preliminary performance, structural and thermal analyses are presented. Author

N83-34122# Electronics Research Lab., Adelaide (Australia).
ON THE USE OF NULL-STEERING ARRAYS TO ENHANCE THE QUALITY OF HF SKYWAVE COMMUNICATIONS
R. H. Clarke Apr. 1983 13 p refs
(ERL-0274-TR; AR-003-115) Avail: NTIS HC A02/MF A01

The quality of HF skywave transmissions is degraded by the presence of multiple propagation paths between transmitter and receiver. Multipath signals are characterized by amplitude fading and associated phase variations as well as a spread in the propagation times and arrival angles of the skywave components. The use of null steering array techniques (either manual or adaptive) to attenuate all but the dominant component of a multicomponent wavefield is discussed. Propagation measurements are presented which give an insight into the type of ionospheric conditions required for null steering arrays to lead to a significant enhancement in the quality of skywave transmissions. Author

N83-34123*# Martin Marietta Corp., Denver, Colo.
THE 15-METER DIAMETER MECHANICALLY SCANNED DEPLOYABLE ANTENNA Final Report
J. V. Coyner, J. J. Herbert, and E. E. Bachtell Apr. 1982 220 p refs
(Contract NAS5-26496)
(NASA-CR-170576; NAS 1.26:170576; MCR-82-1307) Avail: NTIS HC A10/MF A01 CSCL 09C

A preliminary design with structural model data and thermal-performance estimates of a 15-meter mechanically scanned deployable antenna (MSDA) that could be launched onboard a Shuttle Orbiter to provide radiometric brightness temperature maps of the Earth and oceans in selected bands over a frequency range from 1.4 to 11 GHz is provided. The study objectives were met through the design of a unique, integrated, offset feed mast and reflector design that uses the deployable box-truss structure as a building block. The performance of this system is summarized. The all graphite-epoxy, 4.57-meter prototype cube that was completed in 1981 and is proposed for this reflector and feed mast design is presented. Author

N83-34124# Sandia Labs., Albuquerque, N. Mex.
PRECISION DIFFERENTIAL DIGITIZER
A. VanHook Jun. 1983 69 p refs
(Contract DE-AC04-76DP-00789)
(DE83-013864; SAND-83-8232) Avail: NTIS HC A04/MF A01

A high dynamic range, state of the art, differential digitizer and used in coherent anti-Stokes Raman spectroscopy and spontaneous Raman spectroscopy experiments is described. The digitizer is a high speed device used to extract small signal pulses from large background noise levels. The gate window, for differential subtraction, can be varied by front panel control from 50 to 500 ns. A five digit display shows the digital word which is presented to the computer interface and which represents the corrected pulse height. The testing procedures and the design criteria are presented. The setup procedures, with complete FORTRAN programs, are given for individual digitizer analysis. DOE

N83-34125# Pennsylvania State Univ., University Park. Ionosphere Research Lab.
EFFECT OF HF HEATING ARRAY DIRECTIVITY PATTERN ON THE FREQUENCY RESPONSE OF GENERATED ELF VLF Annual Technical Report, CY1982
Kenneth J. Carroll, A. J. Ferraro, Bruce Long, Ray J. Lunnen, H. S. Lee, and Roger Allshouse Jan. 1983 203 p refs
(Contract N00014-81-K-0276)
(AD-A126809; PSU-IRL-SCI-475) Avail: NTIS HC A10/MF A01 CSCL 20/14

Directivity patterns at 3.17 MHz and 5.1 MHz are calculated for the HF antenna array at the high power HF heating facility. The pattern was calculated using pattern multiplication and method of moment techniques. The calculated pattern is shown to be a good approximation to an experimentally measured pattern in one plane of the array. A simple model was used to approximate the effect of the pattern on the frequency response of ELF/VLF signals generated by the HF heating. The frequency response was determined at two ELF/VLF receiver sites. Results show that ELF/VLF generated by side lobes of the HF pattern have sufficient strength to create a ELF/VLF interference pattern at receiving locations. GRA

N83-34126# GTE Sylvania, Inc., Needham Heights, Mass. Communications Systems Div.
FREQUENCY HOPPING TRANSCEIVER MULTIPLEXER Final Report, Aug. 1980 - Mar. 1983
Colin B. Weir Fort Monmouth, N.J. Army Communications-Electronics Command Mar. 1983 384 p
(Contract DAAK80-80-C-0588; DA Proj. 1L1-61102-AH-48)
(AD-A126736; DRSEL-TR-80-0588F) Avail: NTIS HC A17/MF A01 CSCL 09/5

The concept and feasibility of a 30 MHz to 88 MHz frequency hopping transceiver multiplexer is investigated. An approach which uses helical resonator filters, PIN diode switched capacitors and quadrature couplers for combiner and antenna matching circuits represents the most optimistic design. GRA

N83-34127# Naval Research Lab., Washington, D. C. Aerospace Systems Branch.
A GENERIC SPACE BASED RADAR MODEL WITH RESOURCE SCHEDULER Final Report
L. J. Filippelli, S. Angyal, and G. F. VanBlaricum (General Research Corp.) 11 Apr. 1983 38 p refs
(AD-A126639; NRL-MR-5059) Avail: NTIS HC A03/MF A01 CSCL 17/9

A computer software model for a space based radar system is described. The model includes algorithms for estimating ship and aircraft radar cross sections, land and sea clutter, and effects caused by jamming. The model includes a resource schedules which considers prime power and time availability to assign radar coverage of specific regions to a satellite. Author

N83-34128# Naval Postgraduate School, Monterey, Calif.
INVESTIGATIONS INTO THE PERFORMANCE OF A DISTRIBUTED ROUTING PROTOCOL FOR PACKET SWITCHING NETWORKS M.S. Thesis
Anthony W. Lengerich Dec. 1982 157 p refs
(AD-A126790) Avail: NTIS HC A08/MF A01 CSCL 17/2

Packet switching communication networks employ routing protocols to determine the path traversed by each packet as it passes through the network. Routing protocols which are adaptive and can restructure the packet paths in response to localized network congestion are called 'dynamic' routing protocols. Dynamic routing protocols seek to optimize the routing (provide the shortest path) for each packet in the network. Routing protocols which are unaffected by the addition, or deletion of any subset of modes are called 'distributed' routing protocols. The relative performance of two distributed, dynamic routing protocols is determined using computer simulations. The protocols are implemented on fair theoretical networks and tested under a range of network traffic loads. GRA

N83-34129# System Development Corp., Santa Monica, Calif.
INTEROPERABILITY ANALYSIS Interim Technical Report
Carl M. Switzky 8 Jan. 1982 37 p refs
(Contract DCA100-80-C-0044)
(AD-A126563; SDC-TM-7038/220/00) Avail: NTIS HC A03/MF A01 CSCL 17/2

Various methods for interconnecting the Integrated AUTODIN System (IAS) to public data networks were analyzed. The approaches to interoperability include: (1) requiring an IAS phaseover to an X.25 based network, and then incorporating X.75 interfaces to other networks; (2) providing an interface between the DoD protocols at IAS sites and the X.25 based networks and (3) providing a translation between the protocol services offered by the two networks. Author

N83-34130# Environmental Research Inst. of Michigan, Ann Arbor. Radar and Optics Dept.
IMAGING SENSOR DEVELOPMENT FOR SCATTERING ATMOSPHERES Final Technical Report, 1 Jun. 1981 - 1 Jun. 1982
Anthony M. Tai Aberdeen Proving Ground, Md. Army Armament Research and Development Command Mar. 1983 114 p refs
(Contract DAAK11-81-K-0005; DA Proj. 1L1-61101-A-91A)
(AD-A126675; AD-F300220; ARBRL-CR-00508; Rept-155600-3-F)
Avail: NTIS HC A06/MF A01 CSCL 17/8

Several approaches are studied to determine their effectiveness in extracting a low contrast target image from a nonuniform background bias. The approaches are chosen for their potential of being implemented in a real time imaging system. Techniques for combining the advantages of interferometry and digital processing are introduced. A real time sensor system concept is proposed. Author

N83-34131# Boston Coll., Weston, Mass. Dept. of Geology and Geophysics.
SEISMIC COMMUNICATION IN BASIN AND RANGE PROVINCE VALLEYS
Francis A. Crowley Sep. 1982 45 p refs
(Contract F19628-81-K-0005)
(AD-A126685; AFGL-TR-83-0014; SR-2) Avail: NTIS HC A03/MF A01 CSCL 17/2

It has long been recognized that the Earth provides a virtually indestructible path of last resort for communicating with hard buried facilities. There is a need to establish the characteristics for communicating seismically in a landform suitable for MX deployment. The information rates for the seismic noise and response values measured at representative valley sites within the Basin and Range Province under the optimizing condition of constant reception spectra are calculated. GRA

N83-34132# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
SOME COMPLEXITY RESULTS ABOUT PACKET RADIO NETWORKS
Erdal Arikan Mar. 1983 26 p refs
(Contract N00014-76-C-1183; ONR Proj. 049-383; ARPA Order 3045)
(AD-A126696; LIDS-P-1284) Avail: NTIS HC A03/MF A01 CSCL 17/2

It is shown that the decision problem regarding the membership of a given point in the capacity region of a packet radio network (PRN) is NP-complete. The capacity region is the set of all feasible sets of average origin-to-destination traffic rates, where feasibility is defined as the existence of any set of rules for moving the data through the network so that the desired rates are satisfied. The analysis includes a linear programming formulation of TDMA (time-division-multi-access) schemes for PRNs and NP-completeness results for some other related problems. Implicit in the analysis is the optimality of TDMA schemes to achieve a given set of link traffic rates. GRA

N83-34133# Maryland Univ., College Park. Charged Particle Beam Research Group.

EXPERIMENTAL AND THEORETICAL INVESTIGATION OF MICROWAVE AND MILLIMETER WAVE RADIATION FROM HOLLOW, ROTATING, ELECTRON BEAMS Interim Progress Report, 1 Dec. 1981 - 30 Nov. 1982
30 Nov. 1982 22 p refs
(Grant AF-AFOSR-3690-78)
(AD-A126828; AFOSR-83-0201TR) Avail: NTIS HC A02/MF A01 CSCL 20/7

The equipment status, are described and the theoretical studies are outlined. A list of publications and presentations resulting from this work are are also included. GRA

N83-34134# Naval Underwater Systems Center, New London, Conn.
ELF (EXTREMELY LOW FREQUENCY) PVS (PROPAGATION VALIDATION SYSTEM) FIELD STRENGTH MEASUREMENTS, MARCH 1977
Peter R. Bannister 3 Feb. 1983 115 p refs
(AD-A128178; NUSC-TR-6769) Avail: NTIS HC A06/MF A01 CSCL 20/14

From September 1976 to December 1978, extremely low frequency (ELF) field-strength and effective-noise measurements were taken aboard operational submarines. The results of measurements taken in Connecticut and aboard two submarines during March 1977 are discussed. Particular attention is focused on simultaneous Connecticut and North-Atlantic area measurements where nighttime propagation anomalies occurred 2 to 4 hr apart. A prime candidate for the cause of these anomalies is a moving nocturnal sporadic E-layer. Author (GRA)

N83-34135# Defense Nuclear Agency, Washington, D.C.
RADIO WAVE PROPAGATION IN STRUCTURED IONIZATION FOR SATELLITE APPLICATIONS 2
Leon A. Wittwer 1 Aug. 1982 56 p refs
(AD-A128081; AD-E301100; DNA-IR-82-02) Avail: NTIS HC A04/MF A01 CSCL 17/2

This report is an extension of Radio Wave Propagation in Structured Ionization for Satellite Applications, DNA 5304D, Dec 79. That document presented algorithms for calculating signal structure parameters which characterize scintillated radio signals. This report extends the applicability of that work to include locally homogeneous spectral indices less than two. The report also describes the phase effects only component of a scintillated signal and folds antenna effects in the formalism. Finally, a number of loose ends from DNA 5304D were treated. GRA

N83-34136# Nebraska Wesleyan Univ., Lincoln.
SCATTERING CROSS SECTIONS FOR COMPOSITE MODELS OF NON-GAUSSIAN SURFACES FOR WHICH DECORRELATION IMPLIES STATISTICAL INDEPENDENCE Interim Report, 1 Mar. - 30 Nov. 1982
Ezekiel Bahar and Mary Ann Fitzwater Griffiss AFB, N.Y. RADC Mar. 1983 61 p refs
(Contract F19628-81-K-0025; AF Proj. 2305)
(AD-A128435; RADC-TR-83-47) Avail: NTIS HC A04/MF A01 CSCL 20/14

The full wave approach is used to determine the scattering cross sections for composite models of non-Gaussian rough surfaces. It is assumed in this work that the rough surface heights become statistically independent when they decorrelate, thus no delta function type specular term appears in the expression for the scattered fields. The broad family of non-Guassian surfaces considered range in the limit from exponential to Gaussian. It is seen that for small angles of incidence, the like polarized cross sections have the same dependence on the special form of the surface height joint probability density, but for large angles the scattering cross sections for the horizontally polarized waves are much more sensitive to the special form of the joint probability density. The corresponding results for the depolarized backscatter cross section are also presented. The shadow functions are shown to be rather insensitive to the special form of the joint probability density. Author (GRA)

N83-34137# Nebraska Univ., Lincoln.
SCATTERING AND DEPOLARIZATION OF ELECTROMAGNETIC WAVES: FULL WAVE SOLUTIONS Interim Report, 1 Mar. 1981 - 28 Feb. 1982
Ezekiel Bahar Griffiss AFB, N.Y. RADC Mar. 1983 90 p refs
(Contract F19628-81-K-0025; AF Proj. 2305)
(AD-A128436; RADC-TR-82-336) Avail: NTIS HC A05/MF A01 CSCL 20/14

This report consists of three principal parts (Section 2, 3, and 4). The purpose of the research reported in Section 2 is to resolve the apparent discrepancies between different Physical Optics solutions for rough surface scattering. It is also shown in this section that the appearance of the so-called edge effect is due to premature truncation of a closed surface integral. In Section 3, full wave solutions are developed for the depolarization of the scattered radiation fields by conducting objects of irregular shape above rough land and sea. The research reported in this section deals primarily with the deterministic problem. In Section 4, the full wave approach, which accounts for both Bragg scattering and specular point scattering in a self-consistent manner, is employed to evaluate the scattering cross sections for composite models of rough surfaces. It is shown that the full wave solutions for the scattering cross sections can be expressed as a weighted sum of two sections. The like polarized cross sections which are associated with the large scale surface are independent of frequency and polarization . GRA

N83-34138# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
STUDIES OF THE INTERACTIONS OF IONIZING RADIATIONS WITH COMMUNICATIONS MATERIALS Interim Report, 1 Oct. 1980 - 30 Sep. 1982
J. C. Ashley and M. W. Williams Griffiss AFB, N.Y. RADC Apr. 1983 30 p refs
(Contract W-7405-eng-26; AF Proj. 2306)
(AD-A128487; RADC-TR-83-87) Avail: NTIS HC A03/MF A01 CSCL 20/8

This report summarizes experimental and theoretical studies designed to yield information on the interaction of ionizing radiations with various communications materials. In studies carried out during this 2-year period, we have developed various models for calculating the energy loss per unit length, or stopping power, and the inelastic mean free path for electrons in a material. We have included both organic materials such as polyethylene and inorganic materials such as SiO2. In each case, the calculated values of stopping power and mean free path have been compared with experimental values where available and, in the case of mean paths for organic materials, with those predicted from our universal formula. In addition the various models for stopping power and mean free path have been compared with each other. Measurements have been made of electron attenuation lengths (approximately electron mean free paths) as a function of incident electron energy for electrons in amorphous carbon films, as a direct check on the values predicted by our universal formula for electron mean free pths in solid organic insulators. A theory has been developed to describe charge-particle track structure in nonmetallic solids, as the track evolves in time and space. GRA

N83-34139# Science Applications, Inc., La Jolla, Calif.
HANDBOOK FOR DOSE ENHANCEMENT EFFECTS IN ELECTRONIC DEVICES Final Technical Report, Jun. - Sep. 1981
D. M. Long, D. G. Millward, R. L. Fitzwilson, and W. L. Chadsey Hanscom AFB, Mass. RADC Mar. 1983 51 p refs
(Contract F19628-79-C-0116; AF Proj. 4600)
(AD-A128490; RADC-TR-83-84; SAI-101-81-360LJ) Avail: NTIS HC A04/MF A01 CSCL 09/1

The handbook provides tabulation of dose enhancement factors for electronic devices in X-ray and gamma environments. The data is applicable to a wide range of semiconductor devices and selected types of capacitors. The radiation environment includes energy spectra for system design and for radiation test facilities.
Author (GRA)

N83-34140# Beers Associates, Inc., Reston, Va.
EFFECTS OF ATMOSPHERIC INHOMOGENEITY ON LONG RANGE ION BEAM PROPAGATION Final Report, May - Oct. 1982
Howard W. Bloomberg 18 Jan. 1983 43 p refs
(Contract F49620-82-C-0039; AF Proj. 2301)
(AD-A128492; AFOSR-83-0423TR; BEERS-1-83-66-09) Avail: NTIS HC A03/MF A01 CSCL 20/14

A procedure has been developed to determine the particle energy and current for long range, high power flux ion beams. The smallest practical energy for a proton beam was found to be 1 GeV for beam propagation between the position of a high altitude aircraft and 100 km. This beam required a current of about 500 A to suppress extensive radial expansion. A theory of radial beam expansion over decades of inhomogeneity is proposed. It defines a scattering quantity W in the high density segment of the beam trajectory. W is related to the relative amount of radial spread due to scattering occurring within a betatron wavelength. The properties of the charge neutralization channel required for effective beam propagation are considered. It is shown that neutralizing electrons may respond to the bare ion beam charge differently at different locations on the trajectory. This has important implications in the creation of such channels. The effects of an imperfect neutralization channel on beam aiming is discussed.
GRA

N83-34141# Syracuse Univ., N. Y.
THE TRANSVERSE CURRENT ON A STRIP DIPOLE ANTENNA Final Technical Report
A. D. Wunsch Griffiss AFB, Ohio RADC Apr. 1983 18 p refs
(Contract F30602-81-C-0169; AF Proj. 4600)
(AD-A128430; RADC-TR-82-330) Avail: NTIS HC A02/MF A01 CSCL 09/5

The magnitude and distribution of the current flow transverse to the axis of a small strip dipole antenna is evaluated numerically by means of the moment method. This current is found to be small compared to the axial current and to be a sensitive function of the dipole width. Author (GRA)

N83-34142# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ATTENUATION OF RADIATION IN THE 8-13 MICRON WINDOW REGION BY ATMOSPHERIC AEROSOLS
Wang Gengchen 7 Apr. 1983 13 p refs Transl. into ENGLISH of Dagi Kexue (China), v. 6, no. 3, 1982 p 333-337
(AD-A128246; FTD-ID(RS)T-0095-83) Avail: NTIS HC A02/MF A01 CSCL 04/1

The attenuation of infrared radiation by different kinds of aerosols was calculated on the basis of size distribution measured in the real atmosphere and compared with results measured by solar spectrum. The physical characteristics of the aerosols and radiation attenuation under different atmospheric conditions were also analyzed. The results show that attenuation by atmospheric aerosols in the 8 to 13 micron window depends not only on the concentration and the size distribution but also on the chemical composition of the aerosols. Absorption by a polluted atmosphere is obviously different from that by a clean atmosphere. Author

N83-34143# Army Engineer Topographic Labs., Fort Belvoir, Va.
PRELIMINARY RADAR FEATURE EXTRACTION AND RECOGNITION USING TEXTURE MEASUREMENT
Pi-Fuay Chen Jan. 1983 24 p refs
(DA Proj. 4A1-61102-B-52C)
(AD-A128394; ETL-0315) Avail: NTIS HC A02/MF A01 CSCL 17/9

Preliminary results are presented for the automated extraction and classification of a selected set of radar imagery containing city, field, water, and forest images. A sensing array minicomputer system with image texture processing algorithm was employed for the scanning and conversion of radar images into digital signals and also for the extraction of a feature vector from the images. A sequential template-matching classifier was used for the classification of the set of radar imagery into preassigned categories. Slightly better than 90 percent classification accuracy was obtained. Author (GRA)

N83-34144# Rome Air Development Center, Hanscom AFB, Mass.
PROCEEDINGS OF THE RADC MICROWAVE MAGNETICS TECHNOLOGY WORKSHOP
James C. Sethares Griffiss AFB, N.Y. Jan. 1983 368 p refs Workshop held in Hanscom AFB, Mass., 10-11 Jun. 1981
(AD-A126417; RADC-TR-83-15) Avail: NTIS HC A16/MF A01 CSCL 20/14

The state-of-the-art of magnetosttic wave technology in thin magnetic films is discussed. The design, construction, and performance of magnetostatic wave devices are discussed. The use of phase shifters and time delay devices at array and subarray levels of whiteband scanning arrays is described. The fabrication of a low-cost transmitter receiver is described. An introduction to the general theory of adaptive antennas is given. Electronic countermeasures, liquid phase epitaxy, magnetic wave filters and strip transmission lines are among other topics discussed. R.J.F.

N83-34145# Westinghouse Research and Development Center, Pittsburgh, Pa.
MAGNETOSTATIC FORWARD VOLUME WAVE DEVICES
J. Douglas Adam, Michael R. Daniel, and T. W. OKeeffe *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 11-22 refs (For primary document see N83-34144 22-32)
(Contract F33615-77-C-1068)
(AD-P000920) Avail: NTIS HC A16/MF A01 CSCL 20/14

The design, construction and performance of four magnetostatic wave devices operating at X-band is described. They comprise a dispersive delay line with a 1 GHz bandwidth and a differential delay of about 200 nS, a programmable tapped delay line capable of generating and correlating 4-bit Barker codes, a delay stabilized oscillator with output frequency stable to within 1 MHz over the 0 to +65 C range and a 10 channel filter bank. Author

N83-34146# Rome Air Development Center, Hanscom AFB, Mass.
PHASED ARRAY REQUIREMENTS FOR TIME DELAY DEVICES
Robert J. Mailloux *In its* Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 23-43 refs (For primary document see N83-34144 22-32)
(AD-P000921) Avail: NTIS HC A16/MF A01 CSCL 20/14

The use of phase shifters and time delay devices at array and subarray levels of wideband scanning arrays is described. Data defining delay line specifications for low sidelobe phased array applications are given. In addition to random delay errors, it is pointed out that the effects of correlated errors, like multiple transit effects and some dispersive effects, can give rise to high level peak sidelobes. R.J.F.

N83-34147# Rome Air Development Center, Griffiss AFB, N.Y.
SOLID STATE T/R MODULE REQUIREMENTS
E. Hunter Chilton *In its* Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 44-55 refs (For primary document see N83-34144 22-32)
(AD-P000922) Avail: NTIS HC A16/MF A01 CSCL 20/14

The development and fabrication of low cost transmitter receiver modules for phased array radars is discussed. This development process is linked to the development of monolithic microwave integrated technology in two, silicon on sapphire, and gallium arsenide, to cover the frequency range 1-10GHz. R.J.F.

N83-34148# Rome Air Development Center, Griffiss AFB, N.Y.
THE ROLE AND NATURE OF ADAPTIVE ANTENNAS IN ECCM
John A. Graniero *In its* Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 56-72 refs (For primary document see N83-34144 22-32)
(AD-P000923) Avail: NTIS HC A16/MF A01 CSCL 20/14

Background information on the need for adaptive antennas is given. An introduction to the general theory of adaptive antennas is given. Their ability to reject interference through adaptive special filtering, i.e., automatically forming antenna pattern nulls in the

direction of sources of interference, thereby reducing output noise and enhancing the detection of desired signals, is emphasized. R.J.F.

N83-34149# Rome Air Development Center, Griffiss AFB, N.Y.
ADAPTIVE ANTENNA REQUIREMENTS
John Graniero *In its* Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 73-97 (For primary document see N83-34144 22-32)
(AD-P000924) Avail: NTIS HC A16/MF A01 CSCL 20/14

Adaptive antenna requirements for the design of adaptive spatial filters are discussed. Several classes of algorithms used to develop weight control voltages are discussed. R.J.F.

N83-34150# Rockwell International Corp., Anaheim, Calif. Microelectronics Research and Development Center.
EPITAXIAL FERRITES FOR MAGNETOSTATIC WAVE DEVICES
Howard L. Glass *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 98-105 refs (For primary document see N83-34144 22-32)
(Contracts F44620-75-C-0045; F49620-79-C-0048; F49620-80-C-0045)
(AD-P000925) Avail: NTIS HC A16/MF A01 CSCL 20/14

The liquid phase epitaxy method for the growth of single crystal ferrite thin films is reviewed with an emphasis on yttrium iron garnet materials suitable for microwave device applications. Author

N83-34151# Texas Univ., Arlington.
MSW REFLECTING ARRAY FILTERS
John M. Owens, Charles V. Smith, and R. L. Carter *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 106-116 refs Sponsored in part by Army Ballistic Defense Advanced Technology Center and AFOSR (For primary document see N83-34144 22-32)
(AD-P000926) Avail: NTIS HC A16/MF A01 CSCL 20/14

The background and status of new reflective array filter technology based on magnetostatic forward volume wave (MSFVW) propagation in low linewidth (< 0.5 Oe) thin film yttrium-iron garnet. The propagation of MSFVW is nominally isotropic in the plane of the film, with a lowest order mode bandwidth of greater than 2 GHz with center frequency bias field tunable. Theory for single and double reflector arrays based on impedance discontinuities induced by the reflectors is discussed. Experimental results are presented for simple uniform arrays, weighted arrays, a 400 MHz bandwidth linear phase nondispersive delay line with a 30 dB insertion loss and a quadratic phase up chirp filter with a 200 MHz bandwidth product greater than 60 and 3 GHz center frequency. Finally, the future of these devices are discussed as well as their systems implications. R.J.F.

N83-34152# Rome Air Development Center, Hanscom AFB, Mass. Electromagnetic Sciences Div.
MAGNETOSTATIC WAVE TRANSDUCERS
James C. Sethares *In its* Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 117-132 refs (For primary document see N83-34144 22-32)
(AD-P000927) Avail: NTIS HC A16/MF A01 CSCL 20/14

The coupling of magnetostatic wave energy into and out of ferrimagnetic films using flat current carrying conducting strips is discussed. An electrical equivalent circuit model is developed, from which insertion loss is derived for a magnetostatic wave delay line, made up of two multi-element transducers and a yttrium-iron garnet film. Experimental and theoretical comparisons are made and the range of validity of present magnetostatic models is discussed. R.J.F.

N83-34153# Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering and Computer Science.
FIELD GRADIENT CONTROL OF MAGNETOSTATIC WAVES FOR MICROWAVE SIGNAL PROCESSING APPLICATIONS
Frederic R. Morgenthaler *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 133-156 refs (For primary document see N83-34144 22-32)
(Contracts F19628-79-C-0047; DAAG29-80-C-0104; Grant NSF DAR-80-08628)
(AD-P000928) Avail: NTIS HC A16/MF A01 CSCL 20/14

The manner in which direct current field gradients in either the field magnitude, or mode spectra in magnetostatic wave devices is discussed. This is done to control prespecified characteristics such as radio frequency energy distribution, impedance, velocity of energy propagation, and the threshold governing the onset of nonlinear effects due to parametrically-unstable spin waves. The way in which the normal boundary conditions, controlled by the sample geometry, interaction with those imposed by the field gradient is also described. Although magnetostatic wave devices normally employ spatially uniform magnetic bias, control of important features of the modes is afforded through judicious use of direct current field gradients. Such control can be the basis for new forms of microwave signal processors. R.J.F.

N83-34154# Westinghouse Research and Development Center, Pittsburgh, Pa.
SIMPLE MAGNETOSTATIC DELAY LINES
Michael R. Daniel and J. Douglas Adam *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 157-168 refs (For primary document see N83-34144 22-32)
(Contracts F19628-80-C-0150; F33615-77-C-1068)
(AD-P000929) Avail: NTIS HC A16/MF A01 CSCL 20/14

It is described, through calculation and experiment, how simple, single finger, microstrip transducers may be used to demonstrate both linearly dispersive and constant delay type magnetostatic delay lines. The desired delay behavior is achieved over some useful measure of bandwidth through the influence of a close proximity ground plane to the yttrium iron garnet film. The two limitations of this technique are pointed out and one possible remedy to one of them is shown. Author

N83-34155# Rockwell International Corp., Anaheim, Calif.
NONDISPERSIVE AND LINEARLY DISPERSIVE MSW PROPAGATION ON MULTILAYER
Larry R. Adkins and Howard L. Glass *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 169-177 refs (For primary document see N83-34144 22-32)
(Contract F49620-80-C-0045)
(AD-P000930) Avail: NTIS HC A16/MF A01 CSCL 20/14

The dispersive characteristics of magnetostatic waves propagating in multiple magnetic layer structures were evaluated theoretically and experimentally. In general, the multiple layer surface wave mode is useful for nondispersive operation while the multiple layer forward volume wave mode can be used to obtain linearly dispersive characteristics. Experimental confirmation of predicted behavior was obtained for both modes of propagation. Author

N83-34156# Thomson-CSF, Orsay (France).
MAGNETOSTATIC WAVE TEMPERATURE COEFFICIENTS
J. P. Castera *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 178-186 refs Sponsored by Direction des Recherches, Etudes et Techniques (For primary document see N83-34144 22-32)
(AD-P000931) Avail: NTIS HC A16/MF A01 CSCL 20/14

The design and applications of epitaxial yttrim iron garnet (YIG) magnetostatic wave devices will depend upon the variation of the device characteristics versus temperature. A theoretical expression of the delay line oscillator frequency temperature coefficient has been calculated for the three kinds of magnetostatic waves and a comparison between theoretical and experimental results has been done. Temperature stabilization of the frequency of a magnetostatic forward volume wave delay line oscillator has been obtained through the use of a permanent bias magnet made of magnetic materials with a suitable temperature coefficient. Its center frequency of 7.665 GHz is stable to within + or - 1 MHz over the temperature range extending from + 46 C to + III C. Author

N83-34157# State Univ. of New York, Stony Brook. Dept. of Electrical Engineering.
PROPAGATION CHARACTERISTICS OF MAGNETOSTATIC WAVES: A REVIEW
Jay P. Parekh *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 187-200 refs (For primary document see N83-34144 22-32)
(AD-P000932) Avail: NTIS HC A16/MF A01 CSCL 20/14

This paper reviews the propagation characteristics of guided magnetostatic waves (MSW's) in a YIG film magnetized beyond saturation. There exist three guided magnetostatic wave-types, viz., magnetostatic surface waves (MSSW's) and magnetostatic forward and backward volume waves (MSFVW's and MSBVW's). The orientation of the internal bias field determines the particular wave-type that can be supported by the YIG film. The frequency spectrum of the volume waves coincides with that over which magnetostatic plane waves are of the homogeneous variety. The frequency spectrum of the MSSW's is located immediately above the MSVW spectrum. MSW's are dispersive, with the dispersion properties alterable through modification in boundary conditions. The most explored dispersion control technique employs the placement of a ground plane somewhat above the YIG film surface. This dispersion control technique, which provides one method of realizing nondispersive MSW propagation, raises the upper bound of the MSSW spectrum but does not affect the bounds of the MSVW spectrum. Numerical computations illustrating the dispersion and polarization characteristics of MSW's are presented. Author

N83-34158# Litton Industries, College Park, Md.
MSW-POTENTIAL SYSTEMS APPLICATIONS
Pradeep Wahi and Zygmond Turski *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 201-206 refs (For primary document see N83-34144 22-32)
(AD-P000933) Avail: NTIS HC A16/MF A01 CSCL 20/14

Extensive work done indicates that all the magnetostatic modes are associated with varying degree of dispersion. The dispersion in three main modes, surface wave, forward volume wave and Backward volume wave, can be controlled by magnetic field, proximity of the ground plane and thickness of the film. Numerous papers have described applications necessitating either minimization or linearization of dispersion. This paper describes two applications where dispersion is of great interest. In the first case only the magnitude of dispersion is important and the maximization of the dispersion was attempted. Preliminary results are presented. B.W.

N83-34159# State Univ. of New York, Stony Brook. Dept. of Electrical Engineering.
DIFFRACTION OF MAGNETOSTATIC SURFACE WAVES
H. S. Tuan and Jay P. Parekh *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 207-217 refs (For primary document see N83-34144 22-32)
(AD-P000934) Avail: NTIS HC A16/MF A01 CSCL 20/14

This paper reports theoretical computations of magneto-static-surface-wave (MSSW) diffraction resulting from the finite length of practical transducers and the pronounced anisotropy of MSSW propagation. The computed MSSW beam spreading is in good agreement with recently reported experimental results. While the MSSW's are found to suffer a significantly larger beam spreading than SAW's on YZ LINb0 sub 3, the total diffraction loss in a typical configuration comprised of two transducers on a YIG film spaced by a distance of 1cm, with both transducers having an overlapping aperture of 5mm, is at most in the order of a few dB. The diffraction loss is found to decrease with increasing frequency. The latter feature is consistent with the MSSW dispersion characteristics, viz, the MSSW wavelength decreases monotonically with increasing frequency. Thus, as the frequency is increased, a radiating MSSW transducer of given physical length becomes electrically longer so that MSSW collimation is improved and the diffraction loss is reduced. Author

N83-34160# Thomson-CSF, Orsay (France).
MAGNETOSTATIC WAVE RESONATORS
J. P. Castera and P. Hartemann *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 218-227 refs Sponsored by Direction des Recherches, Etudes et Techniques (For primary document see N83-34144 22-32)
(AD-P000935) Avail: NTIS HC A16/MF A01 CSCL 20/14

The purpose of this paper is an overview of recent advances about tunable two-port microwave resonators using the propagation of magnetostatic waves. These waves propagate in yttrium iron garnet films grown by liquid phase epitaxy on gadolinium gallium garnet substrates. 8 dB insertion loss magnetostatic surface wave resonators have been achieved with a loaded Q close to 450 and an out of band rejection of about 10dB. By decoupling the resonator from the transducers, Q values greater than 800 can be obtained with 15 dB insertion loss and a rejection of the off-resonance frequencies greater than 10 dB. Volume wave resonators have a higher Q value of about 1200 and 16 dB insertion loss for a rejection equal to 4 dB. Some experimental results on metal dot array cavity are presented and limitations related to power saturation, frequency versus temperature variations and off-resonance transmission are discussed. Author

N83-34161# State Univ. of New York, Stony Brook. Dept. of Electrical Engineering.
BURIED MAGNETOSTATIC-FORWARD-VOLUME-WAVE TRANSDUCERS
Jay P. Parekh and H. S. Tuan *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 229-236 refs (For primary document see N83-34144 22-32)
(AD-P000936) Avail: NTIS HC A16/MF A01 CSCL 20/14

This paper reports theoretical computations of the magneto-static-forward-volume-wave (MSFVW) excitation characteristics of transducers that are buried within a YIG film. The frequency variation of the radiation resistance of a line-current source and a microstrip transducer is calculated over the entire magnetostatic-volume-wave (MSVW) spectrum. The expectation that the symmetry of transducer location relative to the YIG film must determine whether symmetric or antisymmetric MSFVW's are selectively excited is borne out in the present work. Thus, while a surface-localized microstrip transducer selectively excites the lowest (or alpha=0) mode which is found to be an antisymmetric mode, a microstrip transducer buried half-way across the film selectively excites the lowest symmetric (or alpha=1) mode. The suppression of unwanted modes is far superior with the latter buried microstrip transducer than with a surface-localized microstrip transducer. While the technological problem of implementing buried transducers remains to be resolved, the present results are of relevance to the MSFVW layered structure wherein the transducer is sandwiched between two YIG films. Author

N83-34162# Westinghouse Research and Development Center, Pittsburgh, Pa.
THE EFFECTS OF WIDTH MODES IN MAGNETOSTATIC FORWARD VOLUME WAVE PROPAGATION
J. Douglas Adam *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 237-245 refs (For primary document see N83-34144 22-32)
(Contract F33615-77-C-1068)
(AD-P000937) Avail: NTIS HC A16/MF A01 CSCL 20/14

Delay line amplitude ripple and out-of-band filter response in magnetostatic forward volume devices are shown to be due to the transduction and propagation of width modes, which at low wavenumbers have different phase and group velocities, but at high wavenumbers become degenerate. Various techniques which minimize the effects of width modes are suggested and results obtained on the preferential attenuation of higher order width modes by thin resistive strips are described. Author

N83-34163# Westinghouse Research and Development Center, Pittsburgh, Pa.
MAGNETOSTATIC WAVE PROPAGATION IN YIG DOUBLE FILMS
Michael R. Daniel and P. R. Emtage *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983

p 246-257 refs (For primary document see N83-34144 22-32)
(Contract F19628-80-C-0150)
(AD-P000938) Avail: NTIS HC A16/MF A01 CSCL 20/14

Using the technique of surface permeabilities, an expression is derived for the dispersion of a magnetostatic wave propagating in two close proximity magnetic films. Two modes of propagation are identified respectively as the symmetric and antisymmetric modes from the symmetry of the rf magnetic field. Useful group delay behavior is shown to result from films of equal thickness. Some measurements are reported using two Yttrium Iron garnet films sandwiching simple single finger transducers. Difficulties in exciting the symmetric forward volume mode are explained in terms of the coupling coefficients for these double film structures. Author

N83-34164# Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering and Computer Science.
GUIDING MAGNETOSTATIC SURFACE WAVES WITH NONUNIFORM IN-PLANE FIELDS
Dan D. Stancil and Frederic R. Morgenthaler *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 258-268 refs (For primary document see N83-34144 22-32)
(Contracts F19628-79-C-0047; DAAG29-80-C-0104; Grant NSF DAR-80-08628)
(AD-P000939) Avail: NTIS HC A16/MF A01 CSCL 20/14

The observation of magnetostatic surface waves (MSSW's) was recently reported in a rectangular YIG film placed between strips of mu-metal and in the plane of the strips. However, the interpretation of this experiment was complicated by the fact that the field was nonuniform not only in the transverse direction but along the direction of propagation as well. This latter nonuniformity resulted because the microstrip antenna structure did not allow the strips to extend along the entire path of propagation. Reported here are experiments using a rectangular slab and a different antenna structure which minimizes this difficulty. These experiments suggest that nonuniform in-plane fields can be used to alter the dispersion characteristics of the waves. In addition, new experiments are described in which nonuniform fields caused by a slot in a mu-metal covering layer are used to guide MSSW's through a turn of 160 deg. B.W.

N83-34165# Westinghouse Electric Corp., Baltimore, Md. Advanced Technology labs.
OCTAVE BANDWIDTH MAGNETOSTATIC SURFACE WAVE SIGNAL-TO-NOISE ENHANCER
Steven N. Stitzer *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 269-276 refs (For primary document see N83-34144 22-32)
(Contract F33615-79-C-1715)
(AD-P000940) Avail: NTIS HC A16/MF A01 CSCL 20/14

The signal-to-noise enhancer, a passive two-port device which performs the junction opposite that of the frequency selective microwave power limiter is described. Incoming signals falling below some threshold power level suffer insertion loss up to 30 dB or more. Signals exceeding the threshold, which is on the order of 1 mW, are attenuated by a significantly smaller amount. The difference in insertion loss can be more than 25 dB for signals 20 dB or more above threshold. B.W.

N83-34166# Texas Univ., Arlington. Dept. of Electrical Engineering.
MICROWAVE PULSE COMPRESSION LOOPS USING MAGNETOSTATIC WAVE DELAY LINES
Charles V. Smith, Jr., John M. Owens, R. L. Carter, and K. W. Reed *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 277-289 refs (For primary document see N83-34144 22-32)
(Contract DASG62-79-C-0094; Grant AF-AFOSR-3389-77)
(AD-P000941) Avail: NTIS HC A16/MF A01 CSCL 20/14

Pulse compression systems utilizing surface acoustic wave (SAW) devices have been under intensive investigation for the pst 10 years. These studies have concentrated primarily on linear chirps and the achievement of low time-sidelobes by appropriate amplitude weighting. Both active and passive generation have been utilized in the compression loops, and time-bandwidth products over 1000 with greater than 40 dB sidelobe suppression have been obtained. In general, SAW devices achieve large processing gains by large time delays (1-100 usec) with bandwidths of 50-500 MHz and comparable center frequencies. A new technology based on slow magnetostatic wave (MSW) propagation in a magnetically biased epitaxial yttrium iron garnet (YIG) is emerging as a complementary technology to SAW at microwave frequencies (1-20 GHz). Spin coupling in the magnetostatic modes results in electromagnetic wave propagation at group velocities two orders of magnitude below the speed of light. This dispersive slow wave structure makes the investigation of MSW devices in pulse compression logical. B.W.

N83-34167# Rome Air Development Center, Hanscom AFB, Mass.
CRYSTALLOGRAPHIC EFFECTS IN YTTRIUM-IRON-GARNET (YIG) ON MAGNETOSTATIC SURFACE WAVE PROPAGATION
Robert E. Floyd *In its* Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 290-300 refs (For primary document see N83-34144 22-32)
(AD-P000942) Avail: NTIS HC A16/MF A01 CSCL 20/14

Magnetostatic surface waves (MSSW) were propagated on a 1-inch diameter yttrium-iron garnet (YIG) thin film disc with adjustable coupling transducers. These adjustable transducers enabled the film to be rotated underneath in order to investigate crystallographic influence. Experiments are described and data is plotted for signal power, time delay, beam steering and frequency shifts. A correlation technique was used to evaluate the resulting data, which reveals a 6 theta dependence in some characteristics. Author

N83-34168# Lowell Univ., Mass.
MAGNETOSTATIC WAVE DISPERSION RELATIONS
I. Jacob Weinberg *In* RADC Proc. of the RADC Microwave Magnetics Technol. Workshop Jan. 1983 p 301-316 refs (For primary document see N83-34144 22-32)
(AD-P000943) Avail: NTIS HC A16/MF A01 CSCL 20/14

The results presented here summarize and expand earlier results for magnetostatic wave dispersion relations and for magnetostatic wave oscillators. In what follows is presented the disperson relations for generalized volume waves and generalized surface waves for a thin YIG film bounded by two ground planes. Computer produced curves for volume waves and surface waves are presented. Also presented is a comparison between a theoretically obtained disperson curve for surface waves and one obtained by computer controlled experiment at RADC, Hanscom AFB. B.W.

N83-34169# Lincoln Lab., Mass. Inst. of Tech., Lexington. Group 44.
MULTIPLE SIGNAL DIRECTION FINDING WITH THINNED LINEAR ARRAYS
Darrol F. DeLong 13 Apr. 1983 110 p refs
(Contract F19628-80-C-0002; AF Proj. 649L)
(AD-A128924; ESD-TR-83-008; TST-68) Avail: NTIS HC A06/MF A01 CSCL 17/3

The evaluation of the direction-finding capabilities of nonuniform arrays is approached via algorithm-independent lower bounds on achievable angle estimation errors. Two classes of bounds are considered. The first, known was the Cramer-Rao bound, applies only to unbiased estimates. Compact analytical expressions for these bounds are developed which are applicable to very general direction-finding problems, including an arbitrary number of emitters. It is well-known that Cramer-Rao bounds are overly optimistic at low signal-to-noise ratios. As this ratio decreases, a point is reached at which estimation accuracy decreases abruptly. Another class of bounds, known as Ziv-Zakai bounds, provide information about the location of this threshold point. Their study suggests that poor direction-finding performance occurs in situations where the emitter direction vectors are part of a set which is nearly linearly dependent. Such linear dependence does not occur in the case of uniformly spaced linear arrays (without getting lobes). However, it does occur when elements are removed

from such arrays. A systematic test is developed to test a given array geometry for this condition. GRA

N83-34170# Naval Research Lab., Washington, D. C.
DOPPLER PROCESSING OF RADAR CLUTTER ECHOES WITH LIMITED RANGE EXTENTS Interim Report
Ben H. Cantrell 27 May 1983 51 p refs
(RR0210541)
(AD-A128785; NRL-8693) Avail: NTIS HC A04/MF A01 CSCL 17/9

The Doppler processing of radar echoes from clutter patches of finite range extent was studied. The results of the study show that if the range extent of the clutter patches is known or measured, and if the parameters of the radar's pulse bursts and Doppler processor are set based on this knowledge, then performance can be significantly improved under many cases. Author (GRA)

N83-34171# Naval Ocean Systems Center, San Diego, Calif. Environmental Sciences Dept.
A PROGRAM TO COMPUTE VERTICAL ELECTRIC ELF FIELDS IN A LATERALLY INHOMOGENEOUS EARTH-IONOSPHERE WAVEGUIDE Interim Report, Jun. - Dec. 1982
J. A. Ferguson, L. R. Hitney, and R. A. Pappert 1 Dec. 1982 63 p refs
(Contract DNA-MIPR-82-608)
(AD-A128805; NOSC/TR-851) Avail: NTIS HC A04/MF A01 CSCL 20/14

A computer program for calculating ELF propagation in a laterally nonuniform earth ionosphere waveguide is presented. The program is based on a simple surface propagation model formulated in terms of an integral equation which is solved using a moment method. The disturbance must be localized to the extent that the waveguide disturbance must effectively vanish outside a rectangle of several megameters on a side. The program allows for modeling rectangular, circular, and elliptical disturbances. The lateral propagation function for the vertical electric dipole is calculated. Waveguide height effects are allowed for within the spirit of the WKB approximation. The total vertical electric field is also calculated. Author (GRA)

N83-34172# Columbia Univ., New York. Radiation Lab.
RESEARCH INVESTIGATION DIRECTED TOWARD EXTENDING THE USEFUL RANGE OF THE ELECTROMAGNETIC SPECTRUM Progress Report, 1 Apr. 1982 - 31 Mar. 1983
George W. Flynn 31 Mar. 1983 236 p refs
(Contracts DAAG29-82-K-0080; F49620-82-K-0008; DAAG29-82-K-0089; N00014-78-C-0517; DE-AC02-78ER-S-04940; Grants AF-AFOSR-0009-81; NSF ENG-78-26498; NSF ECS-80-06881; NSF DMR-80-06966; NSF CHE-80-23747)
(AD-A128815; PR-33) Avail: NTIS HC A11/MF A01 CSCL 20/3

Substantial progress has been made in understanding the generation and detection of light from an unified statistical point of view. To this end, the coherence properties and photon statistics of stationary light obtained by the superposition of nonstationary emissions occurring at random times, in accordance with a homogeneous Poisson point process has been investigated. The individual emissions were assumed to be in a coherent, chaotic, or n state. The statistical nature of the mission times results in fluctuations of the relative contributions of different emissions at a given time. In the limit when the emissions overlap strongly, the field exhibits the correlation properties of chaotic light, regardless of the statistics of the individual emissions. This is an important result. The effect of Bernoulli random deletion and additive independent Poisson noise on photon-counting statistics has been examined. Under the action of such deletion and/or noise, both super-Poissonian and sub-Poissonian distributions move toward the Poisson distribution but never convert from one form to the other. We also studied the counting statistics for stationary and non-stationary cascaded Poisson processes, obtaining a simple equation for the variance-to-mean ratio (noisiness) in the limit of long counting times. GRA

N83-34173# Sandia Labs., Albuquerque, N. Mex. Electromagnetic Environment Analysis Div. prs Presented at the Union Radio Scientifique Intern. Symp., Houston, Tex., 23 May 1983
TRANSIENT RESPONSE OF AN INFINITE, CYLINDRICAL ANTENNA IN A DISSIPATIVE MEDIUM
Kenneth C. Chen 12 Jan. 1983 4 p refs
(Contract DE-AC04-76DP-00789)
(DE83-005577; SAND-83-0037C; CONF-830515-1) Avail: NTIS HC A02/MF A01

The transient response of an infinite cylindrical antenna in a dissipative medium due to an exponential waveform excitation is calculated via an exact solution in the form of definite integrals, and a simple and accurate asymptotic formula. The transmission line solution is shown to be a limiting case of the exact solution obtained. By-products of this study include extension of a general asymptotic method to a more-complicated integral and evaluation of a new definite integral. DOE

N83-34174# Fondazione Ugo Bordoni, Rome (Italy).
ELECTROMAGNETIC PROPAGATION IN ANISOTROPIC MEDIA: ASSESSMENT OF PRINCIPAL PLANES ANGLE IN A TERRESTRIAL LINK AT 18 GHz DURING INTENSE RAINFALL
Dario Maggiori, Pier Giorgio Migliorini, and Aldo Paraboni (Politecnico di Milano) Nov. 1982 12 p refs
(FUB-26-1982) Avail: NTIS HC A02/MF A01

Simultaneous measurements of attenuation and depolarization at 18 GHz collected during a propagation experiment on a 9.5 km terrestrial link were employed to extract information about the angle formed by the principal planes with respect to the canting angle. Tilted polarization planes were adopted in order to increase the system sensitivity and to detect the sign of the angle. The measured canting angle was statistically analyzed and cumulative distributions conditioned to the rain intensity were obtained. In all cases the measured values are found to be confined within a few degrees. The distributions obtained exhibit a significant bias at the lowest rain intensity and a standard deviation ranging from 4 degs, for low rain intensity to 1 deg for high rain intensity. Author (ESA)

N83-34175# Fondazione Ugo Bordoni, Rome (Italy).
ERROR PROPAGATION IN DESCRAMBLING
Odoardo Brugia and William Wolfowicz Nov. 1982 7 p refs
(FUB-27-1982) Avail: NTIS HC A02/MF A01

Error propagation through descramblers is described quantitatively by the ratio between output and input errors. After determining the relation between the error sequences at the output and input ports of both reset and self-synchronizing descramblers, it is shown that in the former case the error ratio takes the value of 1 independently of the input error statistics, while in the latter it depends on the descrambler characteristics and input error statistics. Author (ESA)

N83-34176# National Bureau of Standards, Boulder, Colo. National Engineering Lab.
EARTH TERMINAL MEASUREMENT SYSTEM OPERATIONS MANUAL (REVISED)
David F. Wait Jan. 1983 354 p refs
(PB83-189928; NBSIR-83-1679-Rev) Avail: NTIS HC A16/MF A01 CSCL 17B

The Earth Terminal Measurement System (ETMS) was developed to make accurate measurements of Earth terminal parameters such as the figure of merit (G/T), antenna gain relative to a reproducible reference level, the noise equivalent flux (NEF), and noise ulterior flux (NUF). This manual includes the theory of the measurements, measurement procedures, measurement troubleshooting, interpretation of the results, and a discussion of the ETMS software. GRA

N83-34177# Federal Communications Commission, Washington, D. C. Technical Analysis Div.
ADVANCED TECHNOLOGY UHF RECEIVER STUDY. PART 1: RECEIVER PERFORMANCE MEASUREMENTS
H. Davis Feb. 1983 25 p refs

(Proj. RB-81-12)
(PB83-183426; FCC/OST/R83-1-Pt-1) Avail: NTIS HC A02/MF A01 CSCL 17B

Technical data regarding the performance of the advanced technology television receiver is presented. The tests performed on the receiver included measurements related to UHF taboos, receiver noise figure, other interference susceptibilities related to the receiver's design, and operational characteristics. The receiver operates on VHF as well as UHF; however, its operation on VHF is considered nonsignificant in most respects as the primary purpose of the receiver is for study of UHF questions. The receiver is viewed as a device of laboratory interest and not as a prototype for consumer production televisions. Even if the results of the technology are considered encouraging, it is anticipated that individual receiver manufacturers will design different receiver architectures, although the architecture could be employed in consumer products. GRA

N83-34178# National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
DISCUSSION OF GRIDNET ALGORITHMS AND SIMULATION RESULTS Interim Report, 17 May - 12 Nov. 1982
J. A. Epstein Nov. 1982 41 p refs Sponsored in part by DNA (PB83-181768; NBSIR-83-2660) Avail: NTIS HC A03/MF A01 CSCL 17B

The results of computer simulation of GRIDNET are evaluated. The testing and modification of algorithms which permit messages in a GRIDNET to be routed from any source to any destination in a network having thousands of nodes, and to accomplish this routing in an efficient manner using only limited local knowledge of network operability status are described. Estimates were developed for algorithm performance and runtime efficiency. Additional studies were made concerning network connectivity, reducing packet overhead, network topology, and resolving packet overflow. GRA

N83-34179# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
SPEECH PROCESSING
Loughton, England May 1983 122 p refs Lecture held in Trondheim, Norway, 20-21 Jun. 1983, in Copenhagen, 23-24, and in Delft, Netherlands, 27-28 Jun. 1983
(AGARD-LS-129; ISBN-92-0331-7) Avail: NTIS HC A06/MF A01

The following topics of speech processing were addressed: military applications, speech signal, automatic recognition, current equipment and research, assessment of speech systems, and voice technology in naval training systems. For individual titles, see N83-34180 through N83-34188.

N83-34180# Rome Air Development Center, Griffiss AFB, N.Y.
GENERAL REVIEW OF MILITARY APPLICATIONS OF VOICE PROCESSING
Bruno Beek and Richard S. Vonusa *In* AGARD Speech Process. May 1983 20 p refs (For primary document see N83-34179 22-32)
Avail: NTIS HC A06/MF A01

Voice Interactive Systems and their role in military applications are introduced. The history and evolution of automatic speech recognition and synthesis is briefly explored and the current state of the art is reviewed. The term Voice Interactive Systems is defined and the advantages and disadvantages of Voice Interactive Systems are highlighted. Previous applications of speech systems to military problems are summarized, the major application areas are described and current development projects in the U.S. and other NATO countries are presented. Special attention is focused on the cockpit application. Several projects in this area are discussed along with a summary of important issues to consider when applying Voice Interactive Systems to the aircraft environment. Author

N83-34181# National Aeronautical Establishment, Ottawa (Ontario).
THE SPEECH SIGNAL
Melvyn J. Hunt *In* AGARD Speech Process. May 1983 12 p refs (For primary document see N83-34179 22-32)
Avail: NTIS HC A06/MF A01

An introduction to the speech signal with particular emphasis on the recognition of spoken messages is provided. In an attempt to clarify its nature, speech is compared with two other kinds of signal. Some properties of words and phenemes are considered, and unlike many artificial message bearing signals, speech cannot be considered as a simple sequence of independent message units. A speaker adjusts the amount of information in his speech to suit his listener, and the listener carries out an active reconstruction of the message from the information available to him. Turning to recognition by machine, the use of syntactic constraints is first discussed, followed by a look at three kinds of approach to the analysis and representation of speech for recognition purposes. A brief account of speech production is provided in order to explain the motivation for production based representations. Author

N83-34182# AEG-Telefunken, Ulm (West Germany).
ANALYSIS, SYNTHESIS AND TRANSMISSION OF SPEECH SIGNALS
Helmut Mangod *In* AGARD Speech Process. May 1983 17 p refs (For primary document see N83-34179 22-32)
Avail: NTIS HC A06/MF A01

Digital techniques have opened quite new possibilities for processing of speech signals. This is true for analysis and for transmission. These new methods are characterized by a strict adaptation to the very special peculiarities of speech. An overview about the mathematical possibilities and their relevance to the different parts of the speech signal is given. Efforts to represent speech in a digital and more or less redundancy free form gives good insight into all the characteristics of such a highly complex signal. Possibilities for representation of speech signals reach from the very simple pulse code modulation techniques (PCM) to sophisticated vocoders. The research work done for speech transmission and coding has prepared the way for methods to recognize and synthesize speech signals. Automatic speech synthesis is an important tool for the communication between man and machine. An additional introduction into the techniques of automatic speech synthesis is given. Author

N83-34183# Royal Signals and Radar Establishment, Malvern (England).
TECHNIQUES FOR AUTOMATIC SPEECH RECOGNITION
Roger K. Moore *In* AGARD Speech Process. May 1983 12 p refs (For primary document see N83-34179 22-32)
Avail: NTIS HC A06/MF A01

A brief insight into some of the algorithms that lie behind current automatic speech recognition system is provided. Early phonetically based approaches were not particularly successful, due mainly to a lack of appreciation of the problems involved. These problems are summarized, and various recognition techniques are reviewed in the contect of the solutions that they provide. It is pointed out that the majority of currently available speech recognition equipments employ a 'whole-word' pattern matching approach which, although relatively simple, has proved particularly successful in its ability to recognize speech. The concepts of time-normalizing plays a central role in this type of recognition process and a family of such algorithms is described in detail. The technique of dynamic time warping is not only capable of providing good performance for isolated word recognition, but how it is also extended to the recognition of connected speech (thereby removing one of the most severe limitations of early speech recognition equipment). Author

N83-34184# National Aeronautical Establishment, Ottawa (Ontario).
SPEAKER DIFFERENCES IN SPEECH AND SPEAKER RECOGNITION
Melvyn J. Hunt *In* AGARD Speech Process. May 1983 8 p refs (For primary document see N83-34179 22-32)
Avail: NTIS HC A06/MF A01

The range of ways in which speakers differ is surveyed, with

distinctions being drawn on the one hand between physiological and usage differences and on the other hand between those differences stemming from the larynx and those stemming from the vocal tract. Methods of dealing with speaker differences in speaker-independent and speaker-adaptive speech recognition systems are discussed. This is followed by a discussion of the exploitation of speaker differences in speaker recognition systems. The latter discussion is divided into a consideration of speaker verification, in which a speaker is trying to prove his identity, and speaker identification, in which the identity of an unknown speaker has to be discovered and the speaker cannot be expected to cooperate in producing a predetermined phrase. A summary of the present state of the art in dealing with speaker differences together with some guesses about the prospects for practical systems in the near future. Author

N83-34185# Joint Speech Research Unit, Ruislip (England).
A SURVEY OF EQUIPMENT AND RESEARCH
J. S. Bridle *In* AGARD Speech Process. May 1983 7 p refs (For primary document see N83-34179 22-32)
Avail: NTIS HC A06/MF A01

Terms for description of speech recognition systems are defined. A selection of real time, commercially available speech recognition equipment is described, concentrating on the high performance end of the market. Likely developments are indicated. A single approach to automatic speech recognition - that using whole-word templates was discussed. Current attempts to extend the capabilities of this approach, and also look at alternative approaches which are the subject of research in laboratories around the world are explained. Author

N83-34186# Crouzet Aerospace and Systems, Valence (France).
AUTOMATIC RECOGNITION OF SPEECH IN MILITARY AIRCRAFT [RECONNAISSANCE AUTOMATIQUE DE LA PAROLE DANS LES AVIONS D'ARMES]
Jean Robert Costet *In* AGARD Speech Process. May 1983 11 p In FRENCH (For primary document see N83-34179 22-32)
Avail: NTIS HC A06/MF A01

The application of word recognition techniques to vocal command control in military aircraft is discussed. The problems associated with cabin/oxygen mask noise and pilot respiration, and the effects of acceleration on word recognition are addressed. M.G.

N83-34187# Joint Speech Research Unit, Ruislip (England).
INSIDE A SPEECH RECOGNITION MACHINE
J. S. Bridle *In* AGARD Speech Process. May 1983 9 p refs (For primary document see N83-34179 22-32)
Avail: NTIS HC A06/MF A01

Illustration of speech recognition techniques by concentrating on a particular speech recognition system was presented. The system, know as Logos is designed as a flexible, high performance, experimental machine for research on recognition methods and applications aspects. Algorithms for connected word recognition on which the system is based, are presented. Implementing such algorithms in computer programs and special purpose equipment is considered. An overview of the hardware system architecture, pointing out ways that the properties of the algorithms have influenced the design is given. Author

N83-34188# Naval Training Equipment Center, Orlando, Fla.
VOICE TECHNOLOGY IN NAVY TRAINING SYSTEMS
Robert Breaux, MaryAnn Blind (Eagle Technology, Inc.), and Robert R. Lynchard (Eagle Technology, Inc.) *In* AGARD Speech Process. May 1983 19 p refs (For primary document see N83-34179 22-32)
(Grant N61339-80-G-0003)
Avail: NTIS HC A06/MF A01

The nature, constraints and applications of computer voice technology (CVT) are presented. It also shows you how to evaluate voice technology for meeting training requirements, and how to incorporate CVT into your training design. Let's look at the technology - the how does it work of computer speech generation and voice recognition. This is not a highly technical discussion for two reasons. First, a technical discussion would require a highly technical background and would not further your use of the technology. Second, the technology is continually diversifying. It is becoming increasingly difficult to keep track of the various agencies and vendors involved in CVT, no less their individual approaches, techniques, and special interests and applications. Rapid advances in language analysis and other related technologies add to the rapid technical growth of this field. Author

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N83-34189* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ACTIVE LAMP PULSE DRIVER CIRCUIT Patent
Kenyon E. Logan, inventor (to NASA) (International Laser Systems, Inc., Orlando, Fla.) Issued 9 Aug. 1983 10 p Filed 24 Jun. 1981 Supersedes N82-10390 (20 - 01, p 0057)
(NASA-Case-GSC-12566-1; US-Patent-4,398,129; US-Patent-Appl-SN-276748; US-Patent-Class-315-208; US-Patent-Class-315-224; US-Patent-Class-315-225; US-Patent-Class-315-237; US-Patent-Class-315-241R; US-Patent-Class-372-25) Avail: US Patent and Trademark Office CSCL 09C

A flashlamp drive circuit is described which uses an unsaturated transistor as a current mode switch to periodically subject a partially ionized gaseous laser excitation flashlamp to a stable, rectangular pulse of current from an incomplete discharge of an energy storage capacitor. A monostable multivibrator sets the pulse interval, initiating the pulse in response to a flash command by providing a reference voltage to a non-inverting terminal of a base drive amplifier; a tap on an emitter resistor provides a feedback signal sensitive to the current amplitude to an inverting terminal of amplifier, thereby controlling the pulse amplitude. The circuit drives the flashlamp to provide a squarewave current flashlamp discharge. Official Gazette of the U.S. Patent and Trademark Office

N83-34190* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
TRIAC FAILURE DETECTOR Patent
Frank J. Nola, inventor (to NASA) Issued 23 Aug. 1983 11 p Filed 30 Nov. 1981 Supersedes N82-26574 (20 - 17, p 2397)
(NASA-Case-MFS-25607-1; US-Patent-4,400,657; US-Patent-Appl-SN-325886; US-Patent-Class-318-798; US-Patent-Class-318-806; US-Patent-Class-318-729; US-Patent-Class-361-100; US-Patent-Clas-361-90; US-Patent-Class-363-54) Avail: US Patent and Trademark Office CSCL 09C

A failure detector is provided for detecting unidirectional failures in triacs, particularly as used in power factor controllers for induction motors. In a first embodiment, the triac voltage waveform is sensed and upon detection of an unbalanced signal, corresponding to failure of the triac in either the positive or negative direction, the triac is turned full on in both directions. In a second embodiment, a pair of pulsed signals are derived, the pulse durations of which are proportional to the phase difference between the load current and voltage for each half cycle, and the triac is turned full on responsive to a difference in pulse duration between the half cycle signals. An unidirectional open circuit detector is adapted to use a signal from either of the first and second embodiment to turn the triac off in response to an open circuit failure in either direction.

Official Gazette of the U.S. Patent and Trademark Office

N83-34191* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HIGH STABILITY AMPLIFIER Patent
William A. Adams and Victor S. Reinhardt, inventors (to NASA) Issued 30 Aug. 1983 7 p Filed 17 Jul. 1981
(NASA-Case-GSC-12646-1; US-Patent-4,401,953; US-Patent-Appl-SN-284290; US-Patent-Class-330-289; US-Patent-Class-330-310) Avail: US Patent and Trademark Office CSCL 09C

An electrical RF signal amplifier for providing high temperature stability and RF isolation and comprised of an integrated circuit voltage regulator, a single transistor, and an integrated circuit operational amplifier mounted on a circuit board such that passive circuit elements are located on side of the circuit board while the active circuit elements are located on the other side is described. The active circuit elements are embedded in a common heat sink so that a common temperature reference is provided for changes in ambient temperature. The single transistor and operational amplifier are connected together to form a feedback amplifier powered from the voltage regulator with transistor implementing primarily the desired signal gain while the operational amplifier implements signal isolation. Further RF isolation is provided by the voltage regulator which inhibits cross-talk from other like amplifiers powered from a common power supply. Input and output terminals consisting of coaxial connectors are located on the sides of a housing in which all the circuit components and heat sink are located. E.A.K.

N83-34192*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A MATHEMATICAL MODEL FOR THE DOUBLY FED WOUND ROTOR GENERATOR
F. J. Brady 1983 8 p refs Presented at the Power Eng. Soc. Conf., Los Angeles, 17-22 Jul. 1983; sponsored by IEEE
(Contract DE-AI01-76ET-20320)
(NASA-TM-83454; E-1008-1; DOE/NASA/20320-48; NAS 1.15:83454) Avail: NTIS HC A02/MF A01 CSCL 09C

A mathematical analysis of a doubly-fed wound rotor machine used as a constant frequency generator is presented. The purpose of this analysis is to derive a consistent set of circuit equations which produce constant stator frequency and constant stator voltage. Starting with instantaneous circuit equations, the necessary rotor voltages and currents are derived. The model, thus obtained, is assumed to be valid, since the resulting relationships between mechanical power and active volt-amperes agrees with the results of others. In addition, the model allows for a new interpretation of the power flow in the doubly-fed generator. M.G.

N83-34193*# Harris Corp., Melbourne, Fla. Government Electronic Systems Div.
MECHANICALLY SCANNED DEPLOYABLE ANTENNA STUDY Final Report
9 Mar. 1983 145 p
(Contract NAS5-26494)
(NASA-CR-170579; NAS 1.26:170579) Avail: NTIS HC A07/MF A01 CSCL 09C

The conceptual design of a Mechanically Scanned Deployable Antenna which is launched by the STS (Space Shuttle) to provide radiometric brightness temperature maps of the Earth and oceans at selected frequency bands in the frequency range of 1.4 GHz to 11 GHz is presented. Unlike previous scanning radiometric systems, multiple radiometers for each frequency are required in order to fill in the resolution cells across the swath created by the 15 meter diameter spin stabilized system. This multiple beam radiometric system is sometimes designated as a "whiskbroom" system in that it combines the techniques of the scanning and "pushbroom" type systems. The definition of the feed system including possible feed elements and location, determination of the fundamental reflector feed offset geometry including offset angles and f/D ratio, preliminary estimates of the beam efficiency of the feed reflector system, a summary of reflector mesh losses at the proposed radiometric frequency bands, an overall conceptual configuration design and preliminary structural and thermal analyses are included. Author

N83-34194# Sandia Labs., Albuquerque, N. Mex.
EXPERIMENTAL INVESTIGATION OF AN EXPLOSIVE-DRIVEN PULSE POWER SYSTEM
T. J. Tucker, D. L. Hanson, and E. C. Chare 1983 9 p refs Presented at IEEE Power Electron. Specialists Conf., Albuquerque, N. Mex., 6 Jun. 1983
(Contract DE-AC04-76DP-00789)
(DE83-012873; SAND-83-0219C; CONF-830621-9) Avail: NTIS HC A02/MF A01

The results obtained in the test of a pulse power system composed of an explosively driven compressed magnetic field current generator driving an explosive opening switch and a 20 nH inductive load are presented. It is shown that microsecond risetime, multimegampere current pulses can be produced by this technique. DOE

N83-34195# Raytheon Co., Lexington, Mass.
FET NOISE STUDIES Final Technical Report, Jun. 1981 - Sep. 1982
R. A. Pucel Oct. 1982 129 p refs
(Contract F49620-81-C-0052)
(AD-A126792; AFOSR-33-0222TR; S-3147) Avail: NTIS HC A07/MF A01 CSCL 09/5

The GaAs field effect transistor (FET) oscillator is an alternative device for voltage controlled oscillator (VCO) applications because of its inherent wide band electronic tunability, the variety of operating modes possible such as common source, common gate, etc., and the ease of circuit design. However, it has one major drawback, namely, its high near carrier I/f noise which makes it unsuitable for many applications, such as radar systems. Progress made in understanding the relationship between fabrication technology and near carrier oscillator noise of FETs is described. Author

N83-34196# Giordano Associates, Inc., Sparta, N.J.
UNIVERSAL PIN ELECTRONICS Final Report, Aug. 1981 - Sep. 1982
Philip C. Jackson Fort Monmouth, N.J. Army Communications-Electronics Command Sep. 1982 122 p
(Contract DAAK80-81-C-0156; DA Proj. 1L1-62746-A-094)
(AD-A126660; CECOM-81-0146-F) Avail: NTIS HC A06/MF A01 CSCL 14/2

A unique and advanced test system architecture which has the ability to put virtually an entire test system into a test head and is capable of operating at repetition rates of 100 MHz and with test vectors of 250,000 bits deep is discussed. In addition, this new architecture has the potential to also provide extended analog capability with greatly improved reliability in a small physical package and at a reduced cost over conventional automatic test equipments. Block diagrams of the overall system, major subsystem and the single channel are presented and described. Specifications of the overall system and the single channel are also presented. In addition to its use as an off-line ATE, this architecture can bring its inherent testing power directly to build-in-test (BIT) applications. Author

N83-34197# Boeing Aerospace Co., Seattle, Wash.
UPSET RESPONSE TESTING OF MSI INTEGRATED CIRCUITS Final Report, 1 Jun. 1980 - 15 Jan. 1982
Allan H. Johnston 15 Jan. 1982 86 p refs
(Contract DNA001-80-C-0144; DNA Proj. X99-QAXV)
(AD-A128083; AD-E301101; DNA-5915F) Avail: NTIS HC A05/MF A01 CSCL 09/5

This study developed a standard test method for determining the upset response threshold of MSI integrated circuits. Differences in the upset response of internal logic cells were found that were caused by geometrical differences in the design and layout of internal transistors. An analysis method was developed and incorporated into the test standard which can identify these

sensitive locations, providing a basis for selecting operating conditions for upset response testing. GRA

N83-34198# Ohio State Univ., Columbus. Electroscience Lab.
RESEARCH IN THE AREA OF ELECTROMAGNETICS Annual Report, Nov. 1981 - Nov. 1982
Dec. 1982 149 p refs
(Contract N00014-78-C-0049)
(AD-A128470; ESL-710816-12; AR-5) Avail: NTIS HC A07/MF A01 CSCL 20/14

This report presents the fifth annual review of research at Ohio State University sponsored by the Joint Services Electronics Program (JSEP). The research is in the area of electromagnetics and the specific topics are: (1) Diffraction Studies; (2) Hybrid Techniques; (3) Antenna Studies; (4) Time Domain Studies; (5) Transient Signature Measurements of Radar Targets for Inverse Scattering Research. Author (GRA)

N83-34199# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
DISCHARGE WITH HOLLOW CATHODE, SELECTED CHAPTERS
B. I. Moskalev 12 Apr. 1983 85 p Transl. into ENGLISH from the mono. "Razryad s Polym Katodom" Moscow, Energiya, 169 p 84-122
(AD-A128053; FTD-ID(RS)T-0204-83) Avail: NTIS HC A05/MF A01 CSCL 09/1

The arc discharge was utilized for dissociating a beam of deuterium. Although it had a hollow cathode, the effect of the cathode was absent. The arc began from small bright cathode spots, and was then moved rapidly over the butt end of the cylindrical thick-walled graphite cathode. The bright thin compressed cathode spot was compressed by an external magnetic field filament of discharge. Several filaments were observed simultaneously following the cathode spots, which had formed the visible positive column with a diameter approximately equal to the diameter of the cathode conductor. S.L.

N83-34200# Aerospace Corp., El Segundo, Calif. Engineering Group.
STATE-OF-THE-ART ASSESSMENT OF TESTING AND TESTABILITY OF CUSTOM LSI/VLSI CIRCUITS. VOLUME 3: FAULT MODEL ANALYSIS Final Report
M. A. Breuer (Breuer (M. A.) and Associates, Encino, Calif.) and Al J. Carlan Oct. 1982 43 p refs
(Contracts F04701-80-C-0081; F04701-81-C-0082; F04701-82-C-0083)
(AD-A128651; TR-0083(3902-04)-1-Vol-3; SD-TR-83-20-Vol-3) Avail: NTIS HC A03/MF A01 CSCL 14/2

Physical failure in LSI/VSLI circuits is highly dependent on the fabrication technology being used and result in a very complex faulty behavior. To reduce numbers and types of faults that must be handled for test generating and fault simulation, logic fault models are used. The most popular fault model is the single stuck line (SSL) which can emulate many common physical faults. Non-standard faults like short circuits are more difficult to model-usually require modification to the original circuit to allow use of SSL software. This approach is also ideal for handling Complementary Metal oxide Semiconductors faults. Author (GRA)

N83-34201# Pirelli Cable Corp., Union, N.J.
OPTIMIZATION OF THE DESIGN OF METALLIC SHIELD-CONCENTRIC CONDUCTORS OF EXTRUDED DIELECTRIC CABLES UNDER FAULT CONDITIONS Final Report
D. A. Silver, R. G. Lukac, and R. A. Hartlein Apr. 1983 149 p refs Sponsored by EPRI Prepared in cooperation with Georgia Power Co., Atlanta
(EPRI Proj. 1286-2)
(DE83-902332; EPRI-EL-3014) Avail: NTIS HC A07/MF A01

Maximum metallic shield withstand temperatures under short-circuit conditions were determined for round wire and flat strap shielded XLPE insulated cables with various commonly used insulation shield and jacket compounds in sleeved and extruded jacket constructions. A mathematical model and computer program were developed for the calculation of shield temperatures under short-circuit conditions involving various currents and reclosing sequences for the cables tested in this project. These important accomplishments permit the cable engineer to optimize the designs of XLPE insulated cable with round wire and flat strap shields. A simplified laboratory short-circuit test was developed which can be used to establish the short-circuit limitations of cable designs which (1) are subjected to short-circuit conditions significantly different from those utilized in this program and (2) employ insulation shield and jacket compounds with significantly different physical and thermal characteristics than those employed on the cables tested. Author

N83-34202# Westinghouse Electric Corp., East Pittsburgh, Pa. Steam Turbine Generator Technical Operations Div.
ELECTRIC-GENERATOR MONITORING AND DIAGNOSTICS Final Report
F. T. Emery, M. Gottlieb, and G. B. Brandt Sep. 1982 153 p refs Sponsored by EPRI
(EPRI Proj. 970-2)
(DE83-900276; EPRI-NP-2564) Avail: NTIS HC A08/MF A01

Turbine generator availability is improved by developing on line monitoring instrumentation capable of early detection of developing malfunctions. The development work on an on line RF monitor and a fiber optic temperature sensor are reported. The RF monitor detects internal generator arcing and alerts the operator if the arcing level becomes destructively high. The fiber optic temperature sensor detects hot spots in generator stator windings, a high voltage and high electromagnetic flux environment. DOE

N83-34203# Sandia Labs., Albuquerque, N. Mex.
ELECTRON EROSION: A PROPOSED FAILURE MECHANISM FOR HIGH-VOLTAGE CAPACITORS
G. H. Mauldin 1982 7 p refs Presented at 2nd Ann. Capacitor and Resistor Technol. Symp., New Orleans, 6 Apr. 1982
(Contract DE-AC04-76DP-00789)
(DE82-005768; SAND-81-1817C; CONF-820414-1) Avail: NTIS HC A02/MF A01

Continued research effort on the perfluorocarbon high energy density capacitor technology was directed toward a better understanding of the failure mechanism or mechanisms inherent in this technology. A number of varied experiments were conducted to advance this understanding. The results of this experimental effort suggest that a single failure influence is involved. It is hypothesized that this influence is erosion of the dielectric material by electrons stripped off the electrode material and accelerated across the gap between electrodes and dielectric by the fields present. For example, it was observed that the thickness of the liquid layer between electrodes and dielectric, as controlled by winding tightness, has a dramatic effect on discharge life. A thick layer of liquid results in a large increase in discharge life. Author

N83-34204# Sandia Labs., Albuquerque, N. Mex.
RECURSIVE ADAPTIVE-FILTER DESIGN USING AN ADAPTIVE GENETIC ALGORITHM
D. M. Etter, M. J. Hicks, and K. H. Cho 1982 4 p refs Presented at IEEE Conf. on Acoust., Speech and Signal, Paris, 3 May 1982
(Contract DE-AC04-76DP-00789)
(DE82-011014; SAND-81-0249C; CONF-820520-2) Avail: NTIS HC A02/MF A01

An adaptive genetic algorithm for determining the optimum filter coefficients in a recursive adaptive filter is presented. The algorithm is appropriate for use in problems where the function to be optimized is nonunimodal or nonquadratic, such as the mean squared error surface in a recursive adaptive filter. The mechanisms of the algorithm are inspired by adaptive processes observed in nature. After an initial set of possible filters is randomly selected, each filter is mapped to a binary string representation. Selected bit strings are then transformed using the operations of crossover and mutation to build new generations of filters. The probability of selecting a particular bit string to modify and/or replicate for the next generation is inversely proportional to its estimated mean

squared error value. Hence, the process not only examines filter coefficient values, but also retains the advances made in previous generations. DOE

N83-34205# Argonne National Lab., Ill.
ELECTRONIC CONDUCTIVITY OF Li2MnO3 DOPED WITH ALUMINUM, MAGNESIUM OR ZINC
G. H. Kucera, J. W. Sim, and J. L. Smith 1983 2 p refs Presented at the Electrochemical Society Meeting, San Francisco, 8 May 1983
(Contract W-31-109-eng-38)
(DE83-009609; CONF-830508-12) Avail: NTIS HC A02/MF A01

Because Li2MnO3 is chemically stable in highly solvents, it warrants consideration as a starting material for electrode (cathode) development in such systems as the molten carbonate fuel cell and the magnetohydrodynamic (MHD) power generation system. Stoichiometric Li2MnO3, a nonconductor, can be converted into an electronic semiconductor with the use of dopants. In this study, porous sintered samples of aluminum-, magnesium-, and zinc-doped Li2MnO3 were prepared, and the effects of dopant concentration and sintering temperature on electrical conductivity were examined. In addition, tests were performed to determine whether aluminum- and magnesium-doped Li2MnO3 are stable in 62 mol % Li2CO3-38 mol % K2CO3 eutectic at 925 K for a possible molten carbonate fuel cell application. DOE

N83-34206# Department of Energy, Washington, D. C. Electric Power Div.
A GUIDE FOR THE ASSESSMENT OF TECHNOLOGIES FOR GENERATING ELECTRICITY
Jun. 1982 632 p
(DE83-006468; DOE/EIA-0344) Avail: NTIS HC A99/MF A01

A general understanding of electric power generation, each technology is placed in perspective with regard to other technologies, supplementary and more detailed information, and a framework for future updating of data bases maintained by FIA are provided. Information on already commercialized technologies for generating electricity and technologies that have not moved beyond the prototype or demonstration state are included. It does not, however, include nuclear technologies or cogeneration, and does not discuss the fuel costs associated with producing electricity by each technology. DOE

N83-34207# Bendix Corp., Kansas City, Mo.
MONOLITHIC CERAMIC CAPACITORS FOR USE IN HIGH-VOLTAGE ENERGY-STORAGE APPLICATIONS
R. R. Honig Mar. 1983 9 p ref Presented at the 33rd Electron. Components Conf., Orlando, Fla., 16 May 1983
(Contract DE-AC04-76DP-00613)
(DE83-009234; BDX-613-2884; CONF-830517-4) Avail: NTIS HC A02/MF A01

A monolithic ceramic capacitor capable of peak discharge currents of over 2100 A was developed. The miniature capacitor will replace other high voltage energy storage capacitors, usually mylar or reconstituted mica. Production problems are minor and next assembly failures are virtually nonexistent which makes the monolithic ceramic capacitor an excellent alternative to traditional capacitors especially where size is of major concern. DOE

N83-34208# Edgerton, Germeshausen and Grier, Inc., Las Vegas, Nev.
DEVELOPMENT OF HIGH-SPEED MICROCHANNEL PHOTOMULTIPLIER
D. F. Simmons, B. A. Smith, B. A. Davis, and P. B. Lyons 1983 9 p refs Presented at the LASL Conf. on Optics '83, Santa Fe, N.M., 11-15 Apr. 1983 Prepared in cooperation with LASL, N.M.
(Contract W-7405-eng-36)
(DE83-009896; LA-UR-83-918; CONF-830425-2) Avail: NTIS HC A02/MF A01

Progress in the development of a high-speed microchannel plate (MCP) photomultiplier is reviewed. The device consists of a semitransparent photocathode and MCP with a tapered 50 ohm anode. Two phototypes were built and evaluated. One has an accelerating screen between the MCP and anode. The other has no screen, but is otherwise identical. Time response data is presented for the two prototypes showing the effect of the screen. DOE

N83-34209# Oak Ridge National Lab., Tenn. Energy Div.
INTERCONNECTION PROBLEMS ASSOCIATED WITH SMALL DISPERSED ELECTRIC GENERATORS AND INVERTER DEVICES
Ward T. Jewell and Dwight T. Rizy 1983 7 p refs Presented at the 14th Ann. Modeling and Simulation Conf., Pittsburgh, 21 Apr. 1983
(Contract W-7405-eng-26)
(DE83-012065; CONF-830464-1) Avail: NTIS HC A02/MF A01

This paper describes the simulations of electric-utility distribution systems with dispersed generation systems, such as solar photovoltaic and wind-generator systems, supplying power to the utility system. Problems caused by dispersed systems, such as potential damage to the utility system and lowering of power quality, were studied. The results provide guidance in the use of such dispersed systems. DOE

N83-34210# Sandia Labs., Albuquerque, N. Mex.
ELECTROCHEMICAL CHARACTERIZATION OF LIQUID RESISTORS
R. V. Whitely, Jr. and J. M. Wilson 1983 5 p refs Presented at IEEE Power Electron. Specialists Conf., Albuquerque, N. Mex., 6 Jun. 1983
(Contract DE-AC04-76DP-00789)
(DE83-012623; SAND-83-0304C; CONF-830621-5) Avail: NTIS HC A02/MF A01

The chemical reaction products caused by polarization at each electrode were identified. Chronopotentiometry was used to ascertain the limitations on current density to avoid polarization. The polarization effects are cumulative and sufficient time must be allowed for solution reequilibration, maximum duty cycles were determined for various current densities and CuSO4 concentrations. Accelerated life tests were performed with actual PBFA-type resistors. It is shown that the chronopotentiometric experiments produced somewhat conservative quidelines for operating the resistors oriented with the cathode up. It is also shown that, with horizontal or cathode down operation, a significantly longer current pulse can be endured without leading to resistor failure. DOE

N83-34211# California Univ., Livermore. Lawrence Livermore Lab.
DEVELOPING A GATE-ARRAY CAPABILITY AT A RESEARCH AND DEVELOPMENT LABORATORY
Joseph W. Balch, K. Wayne Current (California Univ.), Waldo G. Magnuson, Jr., and Micheal D. Pocha 1983 7 p refs Presented at the 5th Biennial Univ.-Govt.-Ind. Microelectron. Symp., Lubbock, Tex., 25-27 May 1983
(Contract W-7405-eng-48)
(DE83-010585; UCRL-89100; CONF-830548-1) Avail: NTIS HC A02/MF A01

Experiences in developing a gate array capability for low volume applications in a research and development (R and D) laboratory are described. By purchasing unfinished wafers and doing the customization steps in-house. Turnaround time was shortened to as little as one week and the direct costs reduced to as low as $5K per design. Designs generally require fast turnaround (a few weeks to a few months) and very low volumes (1 to 25). Design costs must be kept at a minimum. After reviewing available commercial gate array design and fabrication services, it was determined that objectives would best be met by using existing internal integrated circuit fabrication facilities, the COMPUTERVISION interactive graphics layout system, and extensive computational capabilities. The reasons and the approach taken for; selection for a particular gate array wafer, adapting a particular logic simulation program, and how layout aids were enhanced are discussed. Testing of the customized chips is described. The content, schedule, and results of the internal gate

array course recently completed are discussed. Finally, problem areas and near term plans are presented. DOE

N83-34212# Spar Aerospace Ltd., Ste-Anne-de-Bellevue (Quebec). Microwave Engineering Section.
QPSK SWITCHING MODULATOR, PHASE 2 Final Report
W. Konu and R. Bouchard Paris ESA 25 Mar. 1983 215 p refs
(Contract ESTEC-4643/81/NL-PP)
(RML-009-83-32; ESA-CR(P)-1747) Avail: NTIS HC A10/MF A01

A breadboard QPSK modulator based on a series connected, dual gate FET switching approach was developed to meet a specification provided by ESA. Direct high level modulation immediately prior to the downlink output on a satellite repeater avoids amplitude and phase distortions. The characteristics include 8.2 GHz center frequency, 650 MHz 3 dB bandwidth, 0 dB nominal gain, emitter coupled logics, input logic levels, 200 MHz max input data rate and 2 nsec max rise and fall time. It is shown that it is feasible to implement a QPSK modulator with a dual gate FET, but practical limits are a phase error of 2.5 deg (against 2 in specification) and an amplitude imbalance of 0.5 dB over the temperature range. Measurements on single gate FET's indicate that the dual gate FET's could contribute 1.3% phase error due to the device phase change with temperature. Author (ESA)

N83-34213# Electricite de France, Clamart. Div. Appareillage.
NUMERICAL SIMULATION OF OVERVOLTAGE CAUSED BY LIGHTNING ON AERIAL POWER LINES, INCLUDING THE CORONA EFFECT [SIMULATION NUMERIQUE DES SURTENSIONS DE FOUDRE CREEES SUR LES LIGNES AERIENNES, INCLUANT L'EFFET COURONNE]
Z. Ahcene and G. Bernard 18 Dec. 1981 48 p refs In FRENCH
(HM-71-04658) Avail: NTIS HC A03/MF A01

A corona effect analog model is studied, and the influence of surges due to lightning on power lines is discussed. The effect of a lightning strike on lines with and without guard cables was simulated. Results show that the surge is very strongly damped as it travels away from the strike point. The corona effect lengthens front times and dampens the high frequency components of the propagated waves. Author (ESA)

N83-34214# Electricite de France, Clamart. Div. Machines Tournantes.
SUPERCONDUCTING ALTERNATORS: ACTUAL STATUS AND OUTLOOK [ALTERNATEURS SUPRACONDUCTEURS ETAT ACTUEL ET PERSPECTIVES]
I. A. Glebov, L. I. Chubraeva, J. S. Edmonds, W. R. McCown, G. Ruelle, and J. L. Sabrie Mar. 1982 11 p refs In FRENCH Presented at Comite d'Etudes 2 CIGRE, 1982
(HM-16-978) Avail: NTIS HC A02/MF A01

The state of the art in cryoalternators is reviewed. Cooling systems, inductor geometries, rotor designs, and system configurations are discussed. The first 300 MVA prototypes are under construction. Economic analysis suggests that significant savings in construction, installation and energy consumption are possible, compared with classic turboalternators. Author (ESA)

N83-34215# Electricite de France, Clamart. Div. Machines Tournantes.
CRYOGENERATOR DEVELOPMENT PROGRAM: MODEL ROTOR FIRST OPERATIONAL RESULTS AND INDUSTRIAL CONCLUSIONS
A. Marquet, J. L. Duchateau, P. Denis (Alsthom-Atlantique), R. Gillet (Alsthom-Atlantique), Y. Laumond (Alsthom-Atlantique), and A. Fevrier (Marcoussis Lab.) 27 May 1982 5 p refs Presented at Intern. Cryogenic Eng. Conf. (ICEC 9), Kobe, Japan, 13 May 1982
(HM-16-986) Avail: NTIS HC A02/MF A01

An industrial size model rotor was cooled down several times and underwent low temperature rotating tests. Mechanical results confirm the feasibility of a massive, concentric rings shrunk structure. Tests on superconducting coils show excellent results. Basic cryogenic principles are demonstrated but the behavior at high rotation speed raises difficulties which need a better understanding of interactions between the rotor and the refrigerator. Author (ESA)

N83-34216# Electricite de France, Clamart. Div. Appareillage.
MASTERING ELECTRICAL FAULTS IN HIGH VOLTAGE STATIONS INSULATED USING SF6 [LA MAITRISE DES DEFAUTS ELECTRIQUES DANS LES POSTES BLINDES A TRES HAUTE TENSION ISOLES AU SF6]
G. Bernard 11 Dec. 1981 34 p refs In FRENCH Submitted for publication
(HM-71-04655) Avail: NTIS HC A03/MF A01

Faults occurring in electricity substations were analyzed. While most faults appear during the first few months of operation and can be attributed to running-in problems, or are due to human error, the possibility of arc discharges remains. These discharges cause a sudden increase of heat and pressure in installations and can provoke chemical reactions with insulating materials. Guidelines for selecting materials and designing systems to limit arc induced damage are presented. Author (ESA)

N83-34217# Electricite de France, Clamart. Div. Appareillage.
ATMOSPHERIC OVERVOLTAGE STATISTICS FOR STUDIES OF THE COORDINATION OF SUBSTATION INSULATION [STATISTIQUE DES SURTENSIONS ATMOSPHERIQUES POUR LES ETUDES DE COORDINATION DES ISOLEMENTS DES POSTES]
G. Bernard 5 Jan. 1982 16 p refs In FRENCH
(HM-71-04668; EMTP-G-6) Avail: NTIS HC A02/MF A01

Stress induced by lightning on electric power installations is described. Rules for the variation of the physical parameters of these effects are given. Calculation of overvoltage in a substation and determination of the maximum allowable stress are covered. A calculation method for evaluating the statistical risk of these values being exceeded is presented. Lightning strikes close to the substation (up to 1500 m) and far from it are represented. Author (ESA)

N83-34218# Electricite de France, Clamart. Div. Appareillage.
PROTECTION OF GAS INSULATED SUBSTATIONS AGAINST LIGHTNING OVERVOLTAGES
G. Bernard 25 Aug. 1982 52 p refs Transl. into ENGLISH of Electricite de France (Clamart), Rept. HM-71-04737, 21 Apr. 1982 52 p
(HM-71-04797) Avail: NTIS HC A04/MF A01

Selection of protection devices (air gaps, open arresters, encapsulated arresters) and their locations so as to bring lightning overvoltages below tolerances for electricity substations is discussed. A calculation method for evaluating the statistical risk of these tolerances being exceeded is presented. Methods for representing substation system elements in computerized simulation models are outlined. Author (ESA)

N83-34219# Electricite de France, Clamart. Div. Lignes Aeriennes.
IMPEDANCE CALCULATION MODEL FOR LONG, LOW AND HIGH FREQUENCY GROUNDINGS [MODELE POUR LE CALCUL DE L'IMPEDANCE D'UNE PRISE DE TERRE LONGUE AUX BASSES ET AUX HAUTES FREQUENCES]
P. Kouteynikoff 13 Jan. 1982 25 p refs In FRENCH
(HM-72-04670) Avail: NTIS HC A02/MF A01

A mathematical model for the calculation of the harmonic ground impedance of a rectilinear cable buried horizontally is presented. Frequencies from continuous wave to several MHz can be handled. The cable is represented by a line of uniformly distributed loads, characterized by a conductance and a linear self inductance. Model predictions compare well with measurements from a shock wave generator analyzed by Fourier transformation. Author (ESA)

N83-34220# Edinburgh Univ. (Scotland).
A SELF LOADING CCD BASED FILTER Final Report
W. Donaldson and R. Thomson Nov. 1982 109 p ref
(Contract A-71c/27)
(Rept-309/1412/R03/82/11; BR86893) Avail: NTIS HC A06/MF A01

A self loading filter (SLF) which incorporates CCD analog and digital circuitry on a single chip was developed to provide microprocessors with analog signal processing using CCDs together with flexible digital control. The CCD is designed to operate at up to 200 kHz with a dynamic range of 60 dB and harmonic distoration of -45 dB. The 8 bit reference accuracy allows frequency filtering as well as matched filtering to be performed. By using dynamic logic design techniques and by careful layout, the total power consumption is limited to < 600 mW with supplies of -5, +5 and +15 V. Author (ESA)

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N83-34221* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HEATING AND COOLING SYSTEM Patent
Leland A. Imig and Mickey R. Gardner, inventors (to NASA) Issued 31 Aug. 1982 6 p Filed 30 Apr. 1980 Supersedes N80-25693 (18 - 16, p 2138)
(NASA-Case-LAR-12393-1; US-Patent-4,346,754; US-Patent-Appl-SN-145208; US-Patent-Class-374-46; US-Patent-Clas-165-27; US-Patent-Class-165-61; US-Patent-Class-165-80E; US-Patent-Class-165-12; US-Patent-Class-62-62; US-Patent-Class-62-514R) Avail: US Patent and Trademark Office CSCL 20D

A heating and cooling apparatus capable of cyclic heating and cooling of a test specimen undergoing fatigue testing is discussed. Cryogenic fluid is passed through a block clamped to the speciment to cool the block and the specimen. Heating cartridges penetrate the block to heat the block and the specimen to very hot temperaures. Control apparatus is provided to alternatively activate the cooling and heating modes to effect cyclic heating and cooling between very hot and very cold temperatures. The block is constructed of minimal mass to facilitate the rapid temperature changes.

Official Gazette of the U.S. Patent and Trademark Office

N83-34222 National Maritime Inst., Feltham (England).
THE USE OF RESISTANCE COMPONENT MEASUREMENTS AS DIAGNOSTIC TOOLS IN ASSESSING THE RESISTANCE QUALITIES OF SHIP MODELS
G. E. Gadd Apr. 1983 51 p refs Sponsored by UK Mechanical and Electrical Engineering Requirements Board
(NMI-R-153) Copyright. Avail: Issuing Activity

It is shown that a combination of wave pattern and wake survey measurements can indicate the magnitude of resistance penalties associated with the bow or the stern. The measuring system uses miniature vanewheel anemometers. The wave pattern analysis model is based on linear theory. Resistance component measurements for 11 hull shapes are discussed. Author (ESA)

N83-34223 National Maritime Inst., Feltham (England).
AN INVESTIGATION OF FLOW IMPROVEMENT DEVICES FOR REDUCING PROPELLER EXCITED VIBRATION
G. E. Gadd May 1983 29 p refs Sponsored by UK Mechanical and Electrical Engineering Requirements Board
(NMI-R-157) Copyright. Avail: Issuing Activity

The effectiveness of triangular vortex generators and cambered rectangular planform flow deflectors for improving a poor wake flow to cure propeller excited vibration, and the relative power penalties involved were compared. The wakes were investigated in a wind tunnel where a foreshortened double model was used so that the flow corrective devices were more correctly scaled relative to the local boundary layer thickness than on an undistorted model. Propulsion experiments on a similarly distorted floating model were made in a towing tank. Results suggest that the different devices suffer comparable power penalties for comparable degrees of wake improvement, but reveal differences in their mode of operation. Author (ESA)

N83-34224 Royal Aircraft Establishment, Farnborough (England).
A STUDY OF NORMAL SHOCK-WAVE TURBULENT BOUNDARY-LAYER INTERACTIONS AT MACH NUMBERS OF 1.3, 1,4 AND 1.5
W. G. Sawyer and Carol J. Long 27 Oct. 1982 155 p refs
(RAE-TR-82099; RAE-AERO-3532; BR88360) Copyright. Avail: Issuing Activity

Seven flows involving the interaction between a normal shock wave and a two dimensional turbulent boundary layer were studied. The measurements were made at free-stream Mach numbers of 1.3, 1.4 and 1.5 and at Reynolds numbers based on an effective streamwise run of 1 to 30 million. The results were obtained from comprehensive traverses with pitot and static probes. Standard boundary layer integral parameters based on wall and measured static pressures are presented, together with velocity profiles and the Mach number distribution over the interaction region. The law of the wall and the law of the wake under the influence of strong normal pressure gradients were also investigated. Author (ESA)

N83-34225*# Stanford Univ., Calif. Div. of Applied Mechanics.
ELEMENT-BY-ELEMENT FACTORIZATION ALGORITHMS FOR HEAT CONDUCTION Final Report
Thomas J. R. Hughes, James M. Winget (California Inst. of Technology), and K. C. Park (Lockheed Missile and Space Co., Palo Alto, Calif.) 1983 33 p refs
(Grant NAG1-259)
(NASA-CR-173034; NAS 1.26:173034) Avail: NTIS HC A03/MF A01 CSCL 20D

Element-by-element solution strategies are developed for transient heat conduction problems. Results of numerical tests indicate the effectiveness of the procedures proposed. The small database requirements and attractive architectural features of the algorithms suggest considerable potential for solving large scale problems. Author

N83-34226*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RADIANT HEATING TESTS OF SEVERAL LIQUID METAL HEAT-PIPE SANDWICH PANELS
Charles J. Camarda and Al Basiulis (Hughes Aircraft Co., Torrance, Calif.) Aug. 1983 9 p refs Presented at the AIAA 21st Aerospace Sci. Meeting, Reno, Nev., 10-13 Jan. 1983
(NASA-TM-85669; NAS 1.15:85669; AIAA-83-0319) Avail: NTIS HC A02/MF A01 CSCL 20D

Integral heat pipe sandwich panels, which synergistically combine the thermal efficiency of heat pipes and the structural efficiency of honeycomb sandwich construction, were conceived as a means of alleviating thermal stress problems in the Langley Scramjet Engine. Test panels which utilized two different wickable honeycomb cores, facesheets with screen mesh sintered to the internal surfaces, and a liquid metal working fluid (either sodium or potassium) were tested by radiant heating at various heat load levels. The heat pipe panels reduced maximum temperature differences by 31 percent with sodium working fluid and 45 percent with potassium working fluid. Results indicate that a heat pipe sandwich panel is a potential, simple solution to the engine thermal stress problem. Other interesting applications of the concept include: cold plates for electronic component and circuit card cooling, radiators for large space platforms, low distortion large area structures (e.g., space antennas) and laser mirrors. Author

N83-34227*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Inst. for Computer Applications in Science and Engineering.

NUMERICAL COMPUTATIONS OF TURBULENCE AMPLIFICATION IN SHOCK WAVE INTERACTIONS

Thomas A. Zang (College of William and Mary), M. Y. Hussaini, and Dennis M. Bushnell 28 Apr. 1983 35 p refs

(Contracts NAS1-16394; NAS1-17070; Grant NAG1-109)

(NASA-TM-85413; NAS 1.15:85413; Rept-83-10) Avail: NTIS HC A03/MF A01 CSCL 20D

Numerical computations are presented which illustrate and test various effects pertinent to the amplification and generation of turbulence in shock wave turbulent boundary layer interactions. Several fundamental physical mechanisms are identified. Idealizations of these processes are examined by nonlinear numerical calculations. The results enable some limits to be placed on the range of validity of existing linear theories. M.G.

N83-34228*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Inst. for Computer Applications in Science and Engineering.

ITERATIVE SPECTRAL METHODS AND SPECTRAL SOLUTIONS TO COMPRESSIBLE FLOWS

M. Yousuff Hussaini and Thomas A. Zang (College of William and Mary) 30 Nov. 1982 32 p refs

(Contracts NAS1-15810; NAS1-16394; Grant NAG1-109)

(NASA-CR-173014; NAS 1.26:173014; Rept-82-40) Avail: NTIS HC A03/MF A01 CSCL 20D

A spectral multigrid scheme is described which can solve pseudospectral discretizations of self-adjoint elliptic problems in O(N log N) operations. An iterative technique for efficiently implementing semi-implicit time-stepping for pseudospectral discretizations of Navier-Stokes equations is discussed. This approach can handle variable coefficient terms in an effective manner. Pseudospectral solutions of compressible flow problems are presented. These include one dimensional problems and two dimensional Euler solutions. Results are given both for shock-capturing approaches and for shock-fitting ones. M.G.

N83-34229*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

FREE-STREAM NOISE AND TRANSITION MEASUREMENTS ON A CONE IN A MACH 3.5 PILOT LOW-DISTURBANCE TUNNEL

Ivan E. Beckwith, Theodore R. Creel, Jr., Fang-Jeng Chen (Systems and Applied Sciences Corp.), and James M. Kendall (JPL) Sep. 1983 70 p refs

(NASA-TP-2180; L-15610; NAS 1.60:2180) Avail: NTIS HC A04/MF A01 CSCL 20D

A small scale Mach 3.5 wind tunnel incorporating certain novel design features and intended for boundary-layer-transition research has been tested. The free stream noise intensities and spectral distributions were determined throughout the test section for several values of unit Reynolds number and for nozzle boundary layer bleed on and off. The boundary layer transition location on a slender cone and the response of this to changes in the noise environment were determined. Root mean square free stream noise levels ranged from less than one tenth up to values approaching those for conventional nozzles, with the lowest values prevailing at upstream locations within the nozzle. For low noise conditions, cone transition Reynolds numbers were in the range of those for free flight; whereas for high noise conditions, they were in the range of those in conventional tunnels. E.A.K.

N83-34230*# Scientific Research Associates, Inc., Glastonbury, Conn.

NUMERICAL SOLUTIONS OF NAVIER-STOKES EQUATIONS FOR COMPRESSIBLE TURBULENT TWO/THREE DIMENSIONAL FLOWS IN TERMINAL SHOCK REGION OF AN INLET/DIFFUSER Final Report

N.-S. Liu, S. J. Shamroth, and H. McDonald Washington NASA Aug. 1983 106 p refs

(Contract NAS3-22747)

(NASA-CR-3723; NAS 1.26:3723) Avail: NTIS HC A06/MF A01 CSCL 20D

The multidimensional ensemble averaged compressible time dependent Navier Stokes equations in conjunction with mixing length turbulence model and shock capturing technique were used to study the terminal shock type of flows in various flight regimes occurring in a diffuser/inlet model. The numerical scheme for solving the governing equations is based on a linearized block implicit approach and the following high Reynolds number calculations were carried out: (1) 2 D, steady, subsonic; (2) 2 D, steady, transonic with normal shock; (3) 2 D, steady, supersonic with terminal shock; (4) 2 D, transient process of shock development and (5) 3 D, steady, transonic with normal shock. The numerical results obtained for the 2 D and 3 D transonic shocked flows were compared with corresponding experimental data; the calculated wall static pressure distributions agree well with the measured data. S.L.

N83-34231*# Joint Inst. for Advancement of Flight Sciences, Hampton, Va.

HOMOGENEOUS NUCLEATION AND DROPLET GROWTH IN NITROGEN M.S. Thesis

Edward H. Dotson Sep. 1983 88 p refs

(Contract NCC1-44)

(NASA-CR-172206; NAS 1.26:172206) Avail: NTIS HC A05/MF A01 CSCL 20D

A one dimensional computer model of the homogeneous nucleation process and growth of condensate for nitrogen flows over airfoils is developed to predict the onset of condensation and thus to be able to take advantage of as much of Reynolds capability of cryogenic tunnels as possible. Homogeneous nucleation data were taken using a DFVLR CAST-10 airfoil in the 0.3-Meter Transonic Cryogenic Tunnel and are used to evaluate the classical liquid droplet theory and several proposed corrections to it. For predicting liquid nitrogen condensation effects, use of the arbitrary Tolman constant of 0.25 x 250 billionth m or the Reiss or Kikuchi correction agrees with the CAST-10 data. Because no solid nitrogen condensation were found experimentally during the CAST-10 experiments, earlier nozzle data are used to evaluate corrections to the classical liquid droplet theory in the lower temperature regime. A theoretical expression for the surface tension of solid nitrogen is developed. S.L.

N83-34232*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

THREE-DIMENSIONAL TURBULENT-MIXING-LENGTH MODELING FOR DISCRETE-HOLE COOLANT INJECTION INTO A CROSSFLOW

Chi-Rong Wang and S. Stephen Papell Sep. 1983 16 p refs

(NASA-TP-2200; E-1497; NAS 1.60:2200) Avail: NTIS HC A02/MF A01 CSCL 20D

Three dimensional mixing length models of a flow field immediately downstream of coolant injection through a discrete circular hole at a 30 deg angle into a crossflow were derived from the measurements of turbulence intensity. To verify their effectiveness, the models were used to estimate the anisotropic turbulent effects in a simplified theoretical and numerical analysis to compute the velocity and temperature fields. With small coolant injection mass flow rate and constant surface temperature, numerical results of the local crossflow streamwise velocity component and surface heat transfer rate are conistent with the velocity measurement and the surface film cooling effectiveness distributions reported in previous studies. Author

N83-34233# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.

COHERENT STRUCTURE MODELING OF VISCOUS SUBLAYER TURBULENCE FOR INCOMPRESSIBLE FLOW WITH HEAT TRANSFER AND FOR COMPRESIBLE FLOW Annual Scientific Report, 1 Jan. - 31 Dec. 1982

Dale K. Ota and Dean R. Chapman Feb. 1983 33 p refs

(Grant AF-AFOSR-0083-82; AF Proj. 2307)

(AD-A126506; AFOSR-83-0148TR; SUDAA-CFD-83-1; ASR-1) Avail: NTIS HC A03/MF A01 CSCL 20/4

A Navier-Stokes computational model of the time dependent dynamics and heat transfer in a compressible viscous sublayer was developed. Specific objections are to compute the variation of turbulent Prandtl number across the sublayer for fluids of different molecular Prandtl number, and for flows with streamwise pressure gradient. Various existing theories for turbulent Prandtl number near a wall differ greatly. An exact analytical solution for oscillation shear flow with heat transfer was derived and used to test satisfactorily the accuracy of the numerical algorithms to be used in the equations of motion for the time dependent, heat conduction, and viscous terms. Most of the necessary programming to adapt the Pulliam-Steger code to viscous sublayer modeling is completed. Boundary conditions are formulated for the first test case without heat transfer, and for the initial runs to be made with heat transfer. GRA

N83-34234# Cincinnati Univ., Ohio. Dept. of Aerospace Engineering and Applied Mechanics.

ANALYSIS OF THREE-DIMENSIONAL VISCOUS INTERNAL FLOWS Annual Report, 1 Mar. 1981 - 28 Feb. 1982

K. N. Ghia and U. Ghia Aug. 1982 36 p refs

(Grant AF-AFOSR-0160-80; AF Proj. 2307)

(AD-A126405; AFL-82-8-65; AFOSR-83-0120TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

Physical phenomena significant to turbomachinery applications via the use of appropriate model problems were studied. Laminar and turbulent duct flows, laminar and turbulent separated flows were analyzed. Numerical methods to improve the efficiency and accuracy of the various methods developed and implemented were examined. Fine grid asymptotic solutions were obtained for laminar flow through curved ducts of simple cross sections; also marching solutions were obtained for turbulent flow in the entrance region of curved ducts of simple cross sections. Streamwise separation is examined using the laminar flow through a constricted asymmetric channel and the laminar and turbulent flows past a thick blunt plate as the model problems. High-Re very fine grid solutions were provided for the shear driven cavity problem using a multigrid strongly implicit method. The block Gaussian elimination method is implemented to solve the unsteady Navier-Stokes equations to provide true transient internal viscous flow solutions. GRA

N83-34235# Montana State Univ., Bozeman. Lab. for Supersonic Wind-Tunnel Research.

EXPERIMENTAL STUDY OF TRANSITION IN A COMPRESSIBLE FREE SHEAR LAYER Annual Report, 1 Oct. 1981 - 30 Sep. 1982

A. Demetriades and T. L. Browner Dec. 1982 95 p refs

(Grant AF-AFOSR-0267-80; AF Proj. 2307)

(AD-A126458; AFOSR-83-0144TR; MSU/SWT-TR-82-05) Avail: NTIS HC A05/MF A01 CSCL 20/4

The object of this work is the experimental determination of laminar-turbulent transition in shear layers separating adjacent compressible streams. An earlier theoretical determination of transition, based on a minimum Reynolds number condition, is reviewed as a possible asymptotic transition limit when the flow is either an equilibrium shear layer or an equilibrium wake. A theory for the laminar flow development in the non-equilibrium regime downstream of the trailing edge is also presented for the first time, and is found to agree very well with numerical methods. The transition and laminar flow theories are then joined to design an experiment aimed at producing non-equilibrium flows in a supersonic wind-tunnel, and at detecting the transition zone in such a flow. Flow and transition measurements done in this layer show that the shear-layer transition Reynolds number, based on the layer thickness and the fast-side unit Reynolds number, agrees with the corresponding number found by the equilibrium transition theory within 25%. It is concluded that the asymptotic transition theory utilized gives reasonable estimates even close to the trailing edge. Author

N83-34236# R and D Associates, Marina Del Rey, Calif.

NUMERICAL MODELING OF THE KINEMATICS OF TURBULENT MIXING IN HE-DRIVEN BLAST WAVES Final Report

Allen L. Kuhl and Michael V. Wright Aberdeen Proving Ground, Md. Army Armament Research and Development Command Apr. 1983 44 p refs

(Contract DAAD05-82-M-E260; DA Proj. 1L1-62120-AH-25)

(AD-A126670; ARBRL-CR-00510; RDA-TR-181700-001) Avail: NTIS HC A03/MF A01 CSCL 19/4

High-explosive driven blast waves contain a contact surface which is Rayleigh-Taylor unstable. The kinematics of the mixing at this surface was studied numerically with a one dimensional hydrocode. A k-o turbulence model was used to simulate the growth and decay of turbulence for this problem; source terms were included to model the Rayleigh-Taylor instability mechanism. It is demonstrated that this k-o model does generate turbulent mixing near the contact surface and nowhere else in the flow field. The magnitude of the turbulence depends on the turbulence model parameter, particularly the Rayleigh-Taylor coefficient, C, and the viscosity coefficients. GRA

N83-34237# Sverdrup Technology, Inc., Arnold Air Force Station, Tenn.

CHARACTERISTIC BOUNDARY CONDITIONS FOR ARO-1 Final Report, Oct. 1981 - Sep. 1982

Karl R. Kneile, Donald C. Todd, and James L. Jacocks AEDC May 1983 31 p refs

(AD-A128193; AEDC-TR-82-28) Avail: NTIS HC A03/MF A01 CSCL 12/1

Characteristic boundary condition relations are derived in generalized coordinates for application to the unsteady Euler equations. Procedures are given for inclusion of these boundary condition routines in the computer program designated ARO-1. Author (GRA)

N83-34238*# Wisconsin Univ., Madison. Mathematics Research Center.

A COMPARISON OF SOLUTIONS OF TWO MODEL EQUATIONS FOR LONG WAVES

J. L. Bona (Chicago Univ.), W. G. Pritchard (Essex Univ.), and L. R. Scott (Michigan Univ., Ann Arbor) Feb. 1983 54 p refs

(Contracts NAS1-14101; DAAG29-80-C-0041; F49620-79-C-0149; EY-76-C-02-0016)

(NASA-CR-172858; NAS 1.26:172858; AD-A128076; MRC-TSR-2477) Avail: NTIS HC A04/MF A01 CSCL 12A

This paper is concerned with mathematical models representing the unidirectional propagation of weakly nonlinear dispersive waves. Interest will be directed toward two particular models that are originally studied in the context of surface-wave phenomena in open-channel flows. The purpose of the present paper is to make a quantitative comparison between the solutions to the initial-value problem for each of these models. The basic conclusion of the study is that, on a long time scale T naturally related to the underlying physical situation, the equations predict the same outcome to within their implied order of accuracy. In this case the choice of one of these models over the other to describe a physical problem is apparently immaterial, with factors of incidental convenience probably providing the main criteria in a given situation. Author (GRA)

N83-34239# Wisconsin Univ., Madison. Mathematics Research Center.

SOME NONLINEAR PROBLEMS OF WATER WAVES IN A CHANNEL Technical Summary Report

M. C. Shen Feb. 1983 23 p refs

(Contract DAAG29-80-C-0041; Grant NSF MCS-80-01960)

(AD-A128075; MRC-TSR-2486) Avail: NTIS HC A02/MF A01 CSCL 20/4

On the basis of some approximate equations derived for nonlinear water waves in a channel of variable cross section, several problems of interest, which have attracted much attention recently, will be taken up in this report. First, the authors consider the breaking of an acceleration wave moving toward a shoreline in a general channel. Next, the so-called infinite mass dilemma, which arises in the study of the development of a solitary wave in

a channel of variable cross section, will be resolved. Finally, they shall use an approximation method to study the fission of solitons in a general channel and justify it. Author (GRA)

N83-34240# Spectral Sciences, Inc., Burlington, Mass.
MONTE CARLO CALCULATIONS OF MASS SPECTROMETER FLOW Scientific Report, 26 Jan. 1982 - 26 Jan. 1983
James B. Elgin Hanscom AFB, Mass. AFGL Feb. 1983 80 p refs
(Contract F19628-82-C-0048; AF Proj. 6687)
(AD-A128069; AFGL-TR-83-0057; SSI-TR-30; SR-1) Avail: NTIS HC A05/MF A01 CSCL 07/4

The initial phase of research to develop a Monte Carlo description of the flow within an ionic sampling mass spectrometer. Procedures for handling multiple species, chemical reactions and internal energy transfer are discussed at length. The flow through a sonic orifice for major species is computed and methods for handling minor species are presented. Author (GRA)

N83-34241# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.
CHARACTERISTICS OF A FLUTED NOZZLE GAS EDUCTOR SYSTEM M.S. Thesis
Jerry Wayne Boykin Mar. 1983 227 p refs
(AD-A128065) Avail: NTIS HC A11/MF A01 CSCL 21/2

Cold flow tests were conducted on a four nozzle and a one nozzle gas eductor system. The nozzles employed were fluted with a constant cross sectional area. The four nozzle tests used a mixing stack length-to-diameter ratio, (L/D), of 1.5; the single nozzle tests used L/D ratios of 2.0, 1.75 and 1.5. The total cross sectional area of the four fluted nozzles to the cross sectional area of the mixing stack was 2.5; for the single fluted nozzle, 2.42. Secondary pumping coefficients, mixing stack pressure distributions and exit velocity profiles were determined. The pumping performance of the four fluted nozzle system was found to be comparable to a straight nozzle system, showing no specific advantages. The single fluted nozzle system pumping performance showed a slight improvement with increased L/D. The system performance was comparable to the four straight nozzle system at the same L/D. The peak exit velocities of the single fluted nozzle system were higher than those for the four straight and four fluted nozzle systems. Author (GRA)

N83-34242# United Research Corp., Santa Monica, Calif.
EXPONENTIALLY-VARYING, UNSTEADY STANDING WAVES IN PARALLEL-FLOW BOUNDARY LAYERS Final Report, Mar. 1979 - Jan. 1982
Harold L. Rogler Arnold Air Force Station, Tenn. AEDC May 1983 122 p refs
(Contract F40600-79-C-0002)
(AD-A128131; AEDC-TR-83-4) Avail: NTIS HC A06/MF A01 CSCL 20/4

Fluctuations which oscillate in time and grow or decay exponentially in the streamwise direction are found as solutions of the Orr-Sommerfield equation. The x-wavenumber is purely imaginary; the frequency is real. Since these disturbances do not propagate in the streamwise direction, they are called standing waves. In the direction normal to the wall, they behave as two travelling waves of unequal strengh. Inside the boundary layer and near the edge, the flow field has fluctuating vorticity. The disturbance in the distant free stream is irrotational. Inside the boundary layer, the vorticity originates primarily from the production term, through viscous diffusion to/from the wall, and by convection. Near the wall, an unsteady viscous sublayer forms. Analytical solutions for fluctuations in a uniform mean flow near a wall are presented, along with numerical solutions obtained for Falkner-Skan boundary layers. The mean boundary layer can be influenced by the mean pressure gradient and surface roughness. The feature which distinguishes these solutions from the instability waves, and also distinguishes these solutions from those with free-stream vorticity fluctuations, is the characteristic irrotational fluctuations in the free stream. The standing waves are other means for upstream and downstream influence in the boundary layer. Author (GRA)

N83-34243# Pennsylvania State Univ., University Park. Lab. for Applied Research.
GRID GENERATION ABOUT A FIN-CYLINDER COMBINATION
G. H. Hoffman 30 Mar. 1983 57 p refs
(Contract N00024-79-C-6043)
(AD-A128491; ARL/PSU/TM-83-45) Avail: NTIS HC A04/MF A01 CSCL 12/1

An algebraic grid generation procedure is presented which produces a three dimensional, body fitted coordinate system about a right circular cylinder with four symmetric fins attached. Special features of the grid are an initial value plane normal to the cylinder axis and the ability to cluster lines near the fin and cylinder surfaces for viscous/turbulent flow calculations. The method used is a modification of the Jameson-Caughey procedure developed originally for inviscid transonic flow calculations about wing-fuselage combinations. In this procedure, a sequence of conformal transformations followed by a shearing transformation is used to map the irregular flow domain in physical space into a rectangular shaped computational domain. A three dimensional grid is produced by stacking two dimensional mappings. The method is therefore extremely fast. The main features of the procedure are discussed and two numerical examples of grids are presented for a fin composed of a symmetric Joukowsky airfoil. Author (GRA)

N83-34244# JAYCOR, Alexandria, Va.
TWO-DIMENSIONAL FLUX-CORRECTED TRANSPORT Final Report, 28 Jul. 1980 - 27 Apr. 1982
Raafat H. Guirquis 21 Mar. 1983 176 p refs
(Contract N00173-80-C-0297)
(AD-A128364; AD-E001427; JAYCOR-J206-83-003/6201) Avail: NTIS HC A09/MF A01 CSCL 20/4

The goal of the present work is to extend JPBFCT to a fully two dimensional algorithm, without time splitting, and incorporate the Zalesak flux limiter while still keeping the implementation of the convective, diffusion and antidiffusion processes as physical fluxes. GRA

N83-34245# Naval Research Lab., Washington, D. C.
INTERFACIAL TENSION BY THE DROP WEIGHT (VOLUME) METHOD: EFFECT OF DROP GROWTH RATE
S. E. Phippen and R. C. Little 23 May 1983 14 p refs
(AD-A128409; NRL-MR-5098) Avail: NTIS HC A02/MF A01 CSCL 20/4

An investigation has been made of the effect on drop rate growth on the interfacial tension as determined by the drop weight method. A series of surfactant concentrations for two different surfactants - Aerosol OT and Witconate P10-59 - yielded data which allowed a corrective equation to be developed.
Author (GRA)

N83-34246# New York Univ., New York. Courant Inst. of Mathematical Sciences.
VORTEX FLOWS Final Technical Report
Lu Ting 25 Apr. 1983 17 p refs
(Contract N00014-80-C-0324; NR Proj. 061-266)
(AD-A128411) Avail: NTIS HC A02/MF A01 CSCL 20/4

The authors study flow fields with concentrations of large vorticity in spots or in slender tube-like regions, known as filaments, by a combination of the method of matched asymptotic analyses and numerical method. In many flows of interest, where vorticity effects are important, the flow field may be considered as inviscid and irrotational everywhere except in slender tube-like regions, called vortex filaments; where the vorticity is concentrated. In the usual classical idealization, where the diameter of the filament is small compared to the other scales characterizing the problem, the cross-sectional area of the tube is neglected and the slender tube-like filament is reduced to a curved line, called a vortex line, which is submerged in the fluid field. GRA

N83-34247# Rhode Island Univ., Kingston. Dept. of Mathematics.
STABILITY OF COMPRESSIBLE WAKE AND JET FLOWS Final Report, 15 Feb. 1982 - 14 Feb. 1983
G. R. Verma, S. J. Scherr, and W. L. Hankey Feb. 1983 83 p refs
(Grant AF-AFOSR-0130-82; AF Proj. 2307)
(AD-A128414; AFOSR-83-0425TR) Avail: NTIS HC A05/MF A01 CSCL 20/4

In this report the stability of compressible inviscid jets and wakes has been investigated for various wave numbers and Mach numbers for different velocity profiles. Author (GRA)

N83-34248# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE EFFECT OF A TRANSVERSE MAGNETIC FIELD ON A NON-EQUILIBRIUM IONIZED HIGH VELOCITY GAS STREAM
Wu Chengkang and Wang Boyee 7 Apr. 1983 14 p refs Transl. into ENGLISH from Li Hsuch Hseuh Pao (China), no. 3, 1982 p 291-296
(AD-A128275; FTD-ID(RS)T-1828-82) Avail: NTIS HC A02/MF A01 CSCL 20/4

The theoretical and experimental study of the effect of a transverse magnetic field on an ionized nonequilibrium high velocity gas flow was investigated. In a small scale electric arc wind tunnel, the electron density in the experimental gas flow was reduced by one order of magnitude. This method provided a new way to partially control the electrical characteristics of a low density electrical arc wind tunnel gas flow. Author

N83-34249# Grumman Aerospace Corp., Bethpage, N.Y. Research and Development Center.
THEORETICAL AERODYNAMICS OF JETS IN GROUND EFFECT. PHASE 5: ASYMPTOTIC THEORY OF TURBULENT WALL JETS Final Report, 15 Jun. 1981 - 14 Nov. 1982
R. E. Melnik and A. Rubel Apr. 1983 31 p refs Presented at the 2nd Symp. on Numerical and Phys. Aspects of Aerodyn. Flows, Long Beach, Calif., 17-20 Jan. 1983
(Contract N00014-81-C-0549)
(AD-A128782; RE-654J) Avail: NTIS HC A03/MF A01 CSCL 20/4

This report presents a systematic analysis of two dimensional and radial turbulent wall jets using the method of matched asymptotic expansions. The asymptotic solution is carried out in two stages. The first is based on a two parameter expansion of the full Reynolds averaged equations with a k-epsilon model of turbulence quantities. One of the small parameters, gamma, is related to the nondimensional friction velocity, U sub T, defined by the surface shear stress. It is basically a Reynolds number parameter, gamma = 0 (1n Re)-1, that primarily controls the shear stress effects induced by the wall. The other small parameter, alpha, is related to the modeling constants arising in the chosen turbulence closure. In the present k-epsilon model analysis alpha is identified with the constant, C sub u, appearing in the eddy viscosity formula for the Reynolds shear stress and is a measure of the turbulence levels in the outer free jet part of the flow. The alpha expansion reduces the problem to a classical boundary layer formulation to lowest order. The expansion for gamma approaching 0 leads to a four layer description of the wall jet. The outer layer is closely related to a free jet flow while the innermost layer is a classical law of the wall region. Two additional intermediate layers are needed to effect the matching of the outer and inner layers and to complete the solution. Leading order solutions for each layer are presented and the composite flow field result is compared with an existing numerical solution for the wall jet. Author (GRA)

N83-34250# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
COMPUTER MODELS FOR TWO-DIMENSIONAL STEADY-STATE HEAT CONDUCTION
Mary Remley Albert and Gary E. Phetteplace Apr. 1983 90 p
(DA Proj. 4A7-62730-AT-42)
(AD-A128793; CRREL-83-10) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report outlines the development and verification of two computer models of two dimensional steady-state heat conduction a variety of boundary conditions. One is a finite difference program and the other is a finite element program. The results of each program are compared to two analytic solutions, and to one another. Sample input and output, and user instructions for each program are included. The programs have the same accuracy when modeling problems involving rectangular boundaries. The finite element method is better able to model curved boundaries, while the finite difference program is easier to use. GRA

N83-34251# Brookhaven National Lab., Upton, N. Y. Experimental Modeling Group.
HEAT TRANSFER BETWEEN IMMISCIBLE LIQUIDS ENHANCED BY GAS BUBBLING
G. A. Greene, C. E. Schwarz, J. Klages, and J. Klein Aug. 1982 14 p refs Presented at the Intern. Meeting on Thermal Nucl. Reactor Safety, Chicago, 29 Aug. - 2 Sep. 1982
(Contract DE-AC02-76CH-00016)
(DE83-000977; BNL-NUREG-31795; CONF-820802-46) Avail: NTIS HC A02/MF A01

The phenomena of core-concrete interactions impact upon containment integrity of light water reactors (LWR) following postulated complete meltdown of the core by containment pressurization, production of combustible gases, and basemat penetration. Experiments were performed with nonreactor materials to investigate one aspect of this problem, heat transfer between overlying immiscible liquids whose interface is disturbed by a transverse non-condensable gas flux emanating from below. Hydrodynamic studies were performed to test a criterion for onset of entrainment due to bubbling through the interface and subsequent heat transfer studies were performed to assess the effect of bubbling on interfacial heat transfer rates, both with and without bubble induced entrainment. Non entraining interfacial heat transfer data with mercury-water/oil fluid pairs were observed to be bounded from below within a factor of two to three by the Szekeley surface renewal heat transfer model. DOE

N83-34252# California Univ., Livermore. Lawrence Livermore Lab.
EFFECTS OF A DENSE VAPOUR CLOUD ON TURBULENCE NEAR THE GROUND
R. T. Cederwall, H. C. Rodean, and J. H. Shinn Nov. 1982 4 p refs Presented at 6th Am. Meteorol. Soc. Symp. on Turbulence and Diffusion, Boston, 22 Mar. 1983
(Contract W-7405-eng-48)
(DE83-004308; UCRL-87973; CONF-830307-7) Avail: NTIS HC A02/MF A01

The transport and dispersion of vapor from the LNG spills was studied. An extensive array of instrumentation was deployed to collect micrometeorological and gas concentration data. Wind velocity data were processed to describe the mean wind field and levels of turbulence. Most experiments were run under neutral to unstable atmospheric stability, with wind speeds greater than 5 m/s. Under these conditions, the mean wind field and ambient turbulence level were relatively unaffected by the presence of the vapor cloud. One experiment was done in low wind speed, slightly stable conditions. In this instance, the mean wind and ambient turbulence were modified within about 100 m downwind of the spill point by the cloud. DOE

N83-34253# Argonne National Lab., Ill.
TWO-FLUID MODEL AND IMPORTANCE OF THE INTERFACIAL AREA IN TWO-PHASE FLOW ANALYSIS
M. Ishii, K. Mishima (Kyoto Univ.), I. Kataoka (Kyoto Univ.), and G. Kocamustafaogullari (Wiconsin Univ., Milwaukee) 1982 9 p refs Presented at the 9th US Natl. Congr. of Appl. Mech., Ithaca, N.Y., 21-25 Jun. 1982
(Contract W-31-109-eng-38)
(DE83-007615; CONF-820614-6) Avail: NTIS HC A02/MF A01

The interfacial transfer terms are the weakest link in a two fluid model formulation because of considerable difficulties in terms

of experimentation as well as modeling. However, these terms are of supreme importance for a two fluid model in determining phase interactions between liquid and vapor. In view of these, the interfacial transfer terms were studied in detail and new constitutive relations were developed. The interfacial terms are proportional to the interfacial area and driving force, therefore these two effects are modeled separately. DOE

N83-34254# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

SOME APPLICATIONS OF THE MOVING FINITE ELEMENT METHOD TO FLUID FLOW AND RELATED PROBLEMS

R. A. Berry and R. L. Williamson 1983 14 p refs Presented at the Am. Nucl. Soc. Topical Conf. on Computational Methods, Salt Lake City, 28-31 Mar. 1983

(Contract DE-AC02-76CH-00016)

(DE83-010399; EGG-M-29782; CONF-830304-19) Avail: NTIS HC A02/MF A01

The Moving Finite Element (MFE) method is applied to one dimensional, nonlinear wave type partial differential equations which are characteristics of fluid dynamic and related flow phenomena problems. These equation systems tend to be difficult to solve because their transient solutions exhibit a spacial stiffness property, i.e., they represent physical phenomena of widely disparate length scales which must be resolved simultaneously. With the MFE method the node points automatically move (in theory) to optimal locations giving a much better approximation than can be obtained with fixed mesh methods (with a reasonable number of nodes) and with significantly reduced anificial viscosity or diffusion content. Three applications are considered. In order of increasing complexity they are: a thermal quench problem, an underwater explosion problem, and a gas dynamics shock tube problem. The results are briefly shown. DOE

N83-34255# Argonne National Lab., Ill. Components Technology Div.

EXPERIMENTS ON TUBES CONVEYING FLUID

J. A. Jendrzejczyk and S. S. Chen Feb. 1983 55 p refs

(Contract W-31-109-38)

(DE83-010692; ANL-83-18) Avail: NTIS HC A04/MF A01

Tests are conducted for tubes conveying fluid for six types of support conditions. The objectives are to understand the dynamic characteristics of such systems for different support conditions and to explore the methods to control tube stability. Transition from one instability mechanism to another is examined, and the feasibility of using feedback control to increase the critical flow velocity is demonstrated. DOE

N83-34256# Sandia Labs., Albuquerque, N. Mex.

TWO-DIMENSIONAL TRANSFER IN RADIATIVELY PARTICIPATING MEDIA WITH CONDUCTION BY THE P-N APPROXIMATION

A. C. Ratzel, III and John R. Howell (Texas Univ., Austin) 1982 33 p refs Presented at Intern. Heat Transfer Conf., Munich, West Germany, 6 Sep. 1982

(DE82-005785; SAND-81-1603C; CONF-820901-2) Avail: NTIS HC A03/MF A01

The combined steady state conduction and radiation heat transfer problem for a gray medium within a rectangular enclosure is considered using the differential approximation. The P-1 and P-3 spherical harmonics approximations for the intensity distribution are incorporated in the equation of transfer, and modified Marshak-type boundary conditions are used in the formulation. The enclosure walls are assumed to be isothermal black surfaces. Two and five coupled second order nonlinear partial differential equations are developed for the P-1 and P-3 approximations, respectively, using the energy conservation and moment-of-intensity expressions. The P-1 equations have been numerically solved using finite element techniques, while the P-3 relations have been solved using a finite difference successive-over-relaxation (SOR) algorithm. Two dimensional temperature profiles and hot wall heat transfer results are presented for square enclosures and different optical width rectangular enclosures for a range of Stark numbers. DOE

N83-34257# Argonne National Lab., Ill.

CONVECTIVE BOILING OF AMMONIA AND FREON 22 IN PLATE HEAT EXCHANGERS

C. B. Panchal, D. L. Hillis, and A. Thomas 1983 9 p refs Presented at ASME/JSME Thermal Engr. Joint Conf., Honolulu, Hawaii, 20 Mar. 1983

(Contract W-31-109-eng-38)

Avail: NTIS HC A02/MF A01

An Alfa-Laval plate heat exchanger, previously used as a small ocean thermal energy conversion (OTEC) evaporator, was refurbished and tested. Several series of tests were carried out with ammonia as the working fluid, followed by one with Freon 22. Configurations utilizing all high angle plates and all low angle plates, and alternate high and low angle plates, were tested to determine the optimum combination for OTEC applications. The effects of ammonia contaminated by water on the thermal performance of the heat exchanger were evaluated. The use of the Linde High-Flux Surface on the working-fluid side of a Transfer plate heat exchanger was investigated to determine its effect on performance. DOE

N83-34258# Argonne National Lab., Ill.

MULTIDIMENSIONAL NUMERICAL MODELING OF HEAT EXCHANGERS

W. T. Sha, C. I. Yang, T. T. Kao, and S. M. Cho (FW Energy Applications, Inc.) 1982 10 p refs Presented at 2nd Joint ASME/ANS Nucl. Engr. Conf., Portland, Oreg., 25 Jul. 1982

(Contract W-31-109-eng-38)

(DE83-009048; CONF-820705-11) Avail: NTIS HC A02/MF A01

A comprehensive, multidimensional, thermal-hydraulic model is developed for the analysis of shell-and-tube heat exchangers for liquid-metal services. For the shellside fluid, the conservation equations of mass, momentum, and energy for continuum fluids are modified using the concept of porosity, surface permeability and distributed resistance to account for the blockage effects due to the presence of heat-transfer tubes, flow baffles/shrouds, the support plates, etc. On the tubeside, the heat-transfer tubes are connected in parallel between the inlet and outlet plenums, and tubeside flow distribution is calculated based on the plenum-to-plenum pressure difference being equal for all tubes. It is assumed that the fluid remains single-phase on the shell side and may undergo phase-change on the tube side, thereby simulating the conditions of Liquid Metal Fast Breeder Reactor (LMFBR) intermediate heat exchangers (IHX) and steam generators (SG). DOE

N83-34259# Argonne National Lab., Ill.

SHOCK WAVE PASSAGE THROUGH TWO-PHASE MIXTURES

R. P. Anderson, D. R. Armstrong, and L. Bova 1982 5 p Presented at the Am. Nucl. Soc. Winter Meeting, Washington, D.C., 14 Nov. 1982

(Contract W-109-eng-38)

(DE83-009686; CONF-821103-87) Avail: NTIS HC A02/MF A01

Some postulated accident scenarios lead to a picture with most of the fuel and some structural steel inside the original core volume by frozen plugs at the original core entrance and exit. Eventually the fuel will either melt out or blow out of such a sealed volume but in the interim between plug formation and eventual dispersion the question remains How will the fuel distribute inside the bottled core? Fuel motion is primarily determined by the generation, movement and final recondensation of fuel and steel vapor. When the vapor is generated at a very rapid rate, large amplitude pressure waves are formed. To aid in the analysis of such conditions, an experimental program was set up to study the behavior of a two phase mixture during the passage of a shock wave. DOE

N83-34260# Argonne National Lab., Ill. Reactor Analysis and Safety Div.

INTERFACIAL TRANSFER IN ANNULAR DISPERSED FLOW

M. Ishii and I. Kataoka (Kyoto Univ.) 1982 26 p refs Presented at the NATO Advan. Study Inst. on Nonlinear Raman Spectroscopy and its Chem. Appl., Bad Windshein, West Germany, 23 Aug. 1982

(Contract W-31-109-eng-38)

(DE83-009571; CONF-820811-2) Avail: NTIS HC A03/MF A01

The interfacial drag, droplet entrainment, droplet deposition and droplet-size distributions are important for detailed mechanistic modeling of annular dispersed two-phase flow. In view of this, recently developed correlations for these parameters are presented and discussed. The onset of droplet entrainment significantly alters the mechanisms of mass, momentum, and energy transfer between the film and gas core flow as well as the transfer between the two-phase mixture and the wall. By assuming the roll wave entrainment mechanism, the correlations or the amount of entrained droplet as well as for the droplet-size distribution were obtained from a simple model in collaboration with a large number of data. Then the rate equations for entrainment and deposition were developed. The drag correlations relevant to the droplet transfer is also presented. The comparison of the correlations to various data show satisfactory agreement. DOE

N83-34261# Argonne National Lab., Ill.

MEASUREMENT OF CROSSFLOW FORCES ON TUBES

T. M. Mulcahy 1983 28 p refs Presented at the Am. Soc. of Mech. Engr. Pressure Vessel and Piping Conf., Portland, Oreg., 19 Jun. 1983

(Contract W-31-109-eng-38)

(DE83-008523; CONF-830607-3) Avail: NTIS HC A03/MF A01

A force transducer for measuring lift and drag coefficients for a circular cylinder in turbulent water flow is presented. In addition to describing the actual design, requirements for obtaining valid fluid force test data are discussed, and pertinent flow test experience is related. DOE

N83-34262# Los Alamos Scientific Lab., N. Mex.

PERFORMANCE LIMITS FOR SMOOTH-WALL GRAVITY-ASSISTED HEAT PIPES

F. C. Prenger, J. E. Kemme, M. Groll (Stuttgart Univ., West Germany), and T. Spendel (Stuttgart Univ., West Germany) 1983 6 p refs Presented at the 18th Thermophys. Conf., Montreal, 1-3 Jun. 1983 Previously announced in IAA as A83-32707

(Contract W-7405-eng-36)

(DE83-011324; LA-UR-83-1080) Avail: NTIS HC A02/MF A01

The data are correlated with parameters derived from flooding in countercurrent, two phase flows. Tests using smooth walled, wickless heat pipes demonstrate the applicability of two phase flow correlations for predicting performance limits in gravity assisted heat pipes. DOE

N83-34263# Brookhaven National Lab., Upton, N. Y. Dept. of Nuclear Energy.

INTERFACIAL DRAG FOR TWO-PHASE FLOW THROUGH HIGH-PERMEABILITY POROUS BEDS

N. K. Tutu, T. Ginsberg, and J. C. Chen (Lehigh Univ.) 1983 9 p refs Presented at 21th AICHE/ASME Natl. Heat Transfer Conf. on Interfacial Transport Phenomena, Seattle, 24-28 Jul. 1983

(Contract DE-AC02-76CH-00016)

(DE83-011643; BNL-NUREG-32950; CONF-830702-12) Avail: NTIS HC A02/MF A01

Pressure drop and void fraction measurements in two phase (air-water) flow through porous beds of randomly packed spheres were used to determine the interfacial gas-liquid drag and the gas-solid drag for the case of zero net liquid flux through the bed. It is shown that the interfacial gas-liquid drag term is of the same order as the gas-solid drag term when the particle size is greater than 6 mm. DOE

N83-34264# Argonne National Lab., Ill. Reactor Analysis and Safety Div.

HYDRODYNAMICS OF ADIABATIC INVERTED ANNULAR FLOW: AN EXPERIMENTAL STUDY

George DeJarlais and Mamoru Ishii 1983 15 p refs Presented at the 3rd Multi-phase Flow and Heat Transfer Symp., Miami, Fla., 18 Apr. 1983

(Contract W-31-109-eng-38)

(DE83-011748; CONF-830439-5) Avail: NTIS HC A02/MF A01

A study in which inverted annular flow was simulated in an adiabatic system is discussed. Turbulent water jets, issuing downward from long-aspect nozzles were enclosed within cocurrent gas annuli. Jet-core diameter and velocity, and gas-annulus diameter, velocity, and species were varied, yielding liquid Reynolds numbers up to 33,000, void fractions from 0.29 to 0.95, and relative velocities from near zero to over 80 m per s. Jet-core break-up lengths and secondarily, core break-up mechanisms, were observed visually, using strobe lighting. DOE

N83-34265# Karlsruhe Univ. (West Germany). Ausbreitungs- und Transportvorgaenge in Stroemungen.

TURBULENT STEP FLOW IN FLAT CHANNEL AND OPEN DUCTS [DIE TURBULENTE STUFENSTROEMUNG IN FLACH-KANAELEN UND OFFENEN GERINNEN]

Cameron D. Tropea Dec. 1982 152 p refs In GERMAN Sponsored by Deutsche Forschungsgemeinschaft and Toronto Univ.

(KU-SFB-80/E/210) Avail: NTIS HC A08

The flow characterizing the momentum transport in turbulent flow over a step was investigated. A two dimensional step is chosen as flow model for the separated flow. A test stand was built; laser Doppler anemometer and signal processing based on a transient recorder are described. The measurements provide the time averaged length of the separation layer as a function of Reynolds number and expansion ratio of the test domain. Local velocities were obtained for a few parameters. A numerical calculation model for turbulent separated flow was developed with the experimentally obtained data base. Author (ESA)

N83-34266# Danish Research Center for Applied Electronics, Hoersholm.

ANALYSIS AND TESTING OF THE THERMAL PROPERTIES OF SPACE BATTERY CELLS, PHASE A Final Report

A. Laursen and Halkjaer Jacobsen Paris ESA Jan. 1983 71 p refs

(Contract ESA-4981/82/NL-JS(SC))

(ECR-1077-82-12; ESA-CR(P)-1745) Avail: NTIS HC A04/MF A01

Measurements of heat dissipation or heat flow rate from the cell to the environment were performed in an isothermal calorimeter where the cell was subjected to defined charge-discharge conditions. The measuring technique, calibration procedures and calorimeter set-up are described. Results obtained using different types of NiH2 and NiCd batteries are presented. Calculation and experimental measurements of thermal capacity were also performed. The measurement accuracy is discussed showing that the instrument accuracy is 1.13% rms for heat flow measurements and 2.04% rms for thermal capacity measurements. Author (ESA)

N83-34267# Technische Hochschule, Darmstadt (West Germany). Fachbereich Mathematik.

SINGULAR PERTURBATIONS FOR THE EXTERIOR THREE-DIMENSIONAL SLOW VISCOUS FLOW PROBLEM

Thomas M. Fischer, George C. Hsiao (Delaware Univ., Newark), and Wolfgang L. Wendland Mar. 1983 29 p refs Submitted for publication Sponsored in part by Alexander von Humboldt Stiftung

(Preprint-742) Avail: NTIS HC A03/MF A01

The rigorous justification of the formal asymptotic expansions constructed by the method of matched inner and outer expansions is established for the three dimensional steady flow of a viscous, incompressible fluid past an arbitrary obstacle. The justification is based on a series representation of the solution to the Navier-Stokes equations, and involves the reductions of exterior boundary value problems for the Stokes and Oseen equations to boundary integral equations of the first kind from which existence as well as asymptotic error estimates for the solutions are deduced. It is shown that the force exerted on the obstacle by the fluid admits an asymptotic representation as the Reynolds number tends to 0 from above. Author (ESA)

N83-34268# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.

INTERNATIONAL ENERGY AGENCY, HEAT PUMP CENTER: THE ROLE OF CNR/PFE IN ITALY [INTERNATIONAL ENERGY AGENCY: HEAT PUMP CENTER: IL RUOLO DEL CNR/PFE E DELL'ITALIA]

F. Dallavalle, E. Piantoni, and V. Recchi 1983 40 p In ITALIAN Presented at Conv. le Pompe di Calore ed i Risparmi Energetici, Bolanzo, Italy, 7-8 Apr. 1983
(CISE-2021) Avail: NTIS HC A03/MF A01

The official integration of Italy to the International Energy Agency (IEA) heat pump centers program is discussed. The National Research Center coordinates the Italian activities related to the IEA. The operating programs of several types of heat pumps, coordinated by different countries are described. The heat pump markets in European countries and in the United States are briefly commented on. Author (ESA)

N83-34269# Electricite de France, Chatou. Dept. Optimisation et Automatisation des Processus.

INDUSTRIAL HEAT PUMPS, STUDIES AND CONSTRUCTION: ACTIVITIES OF ELECTRICITE DE FRANCE'S PROCESS AUTOMIZATION DIVISION, 1976 - SEPTEMBER 1981 [POMPES A CHALEUR INDUSTRIELLES, ETUDES ET REALISATIONS: POINT DE L'ACTIVITE DE LA DIVISION AP DE 1976 A SEPTEMBRE 1981]

J. F. Reynaud Oct. 1981 7 p In FRENCH
(HP-42/81/18) Avail: NTIS HC A02/MF A01

Investigations of the performance of 59 industrial heat pumps are summarized. The development of mechanical recompression of steam in industry is documented. Only 4 clients decided to build heat pumps in 1981, as against 50 who installed steam recompressors. Author (ESA)

N83-34270# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Bereich Raumfahrt Thermodynamik.

STUDY ON ACCOMMODATION OF A HEAT PUMP EXPERIMENT ON THE EUROPEAN RETRIEVABLE CARRIER (EURECA) Final Report

H. Kreeb and G. Riebold Paris ESA Apr. 1983 119 p
(Contract ESTEC-5145/82/NL-PP(SC))
(ESA-CR(P)-1760) Avail: NTIS HC A06/MF A01

A data base which enables the Dynamic Cooler Experiment (DCE) to be tested on board EURECA was developed. Mechanical, thermal, and electrical interfaces, and operational and safety aspects were studied. The experiment controller is the electrical link between EURECA and the DCE controller. It is reused from the SPAS-01 project. The experiment cooling loop is the active thermal interface to EURECA, and necessitates a design where two component groups are connected in parallel to a bypass. The heat dissipation experiment components discharge via a dedicated cold plate to the cooling loop. Ground support equipment is reused from SPAS-01. Author (ESA)

N83-34271*# National Engineering Lab., East Kilbride (Scotland).

AN INTERCOMPARISON OF NEL AND DHL WATER FLOW FACILITIES USING A TWIN ORIFICE PLATE FLOWMETER ASSEMBLY

J. deJong (Delft Hydraulics Laboratory) and E. A. Spencer Jan. 1983 30 p refs
Avail: NTIS HC A03/MF A01

A 205 mm transfer standard orifice plate meter assembly, consisting of two orifice plates in series separated by a length of pipe containing a flow straightener, was calibrated in two water flow facilities. Results show that the agreement in the characteristics of such a differential pressure transfer standard package is within 0.17% over a 10:1 range from flow rates of approximately 8 to 80 l/sec. When the range over which the comparison was made was limited to that for which the calibration graphs gave straight lines, the agreement is $> 0.1\%$ in 3 of the 4 calibrations (0.17% in the fourth). Author (ESA)

N83-34078# Kyushu Univ., Fukuoka (Japan). Dept. of Civil Engineering Hydraulics and Soil Mechanics.

NUMERICAL CALCULATIONS OF A CONVECTIVE-DISPERSION EQUATION IN SHEAR FLOW BY METHOD OF SHIFTING PARTICLES

Kazuro Momii and Kenji Jinno *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 55-68 refs (For primary document see N83-34075 22-31)
Avail: NTIS HC A07/MF A01

N83-34080# Kyushu Univ., Fukuoka (Japan). Dept. of Civil Engineering Hydraulics and Soil Mechanics.

REFLECTION OF NORMAL AND OBLIQUE INCIDENT WAVES AT PERFORATED AND HORIZONTAL SLIT QUAYWALLS WITH RESERVOIR

Hedeaki Okuzono, Akinori Yoshida, and Takeshi Ijima *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 87-108 refs (For primary document see N83-34075 22-31)
Avail: NTIS HC A07/MF A01

N83-34081# Kyushu Univ., Fukuoka (Japan). Power Div.

POST-BURNOUT HEAT TRANSFER TO FREON FLOWING IN A VERTICAL TUBE AT HIGH SUBCRITICAL PRESSURES

Kaneyasu Nishikawa, Suguru Yoshida, Hideo Mori, and Hiroshi Takamatsu *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 109-132 refs (For primary document see N83-34075 22-31)
Avail: NTIS HC A07/MF A01

N83-34831# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.

JET MIXING [STRAHLMISCHUNG]

Bernard Bauer *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 220-289 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

N83-34833# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.

COMPUTATION OF UNSTEADY COMPRESSIBLE FLOW THROUGH COUNTER-ROTATING FLAT BLADE CASCADES [BERECHNUNG DER INSTATIONAEREN KOMPRESSIBLEN STROEMUNG DURCH GEGENEINANDER BEWEGTE EBENE SCHAUFELGITTER]

K. Foerster *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecract Devices: Summary of Work and Results for 1980, 81, 82 1982 p 325-340 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

N83-34835# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.

COMPUTATION OF CHEMICALLY REACTING FLOWS [BERECHNUNG CHEMISCH REAGIERENDER STROEMUNGEN]

J. Algermissen *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 379-393 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

N83-34836# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.

TRANSONIC AND SUBSONIC COMPRESSORS [TRANSCHALL- UND UEBERSCHALLVERDICHTER]

Hans-Heiner Fruehauf *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 394-483 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

N83-34839# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.

COMPUTATION OF THE FLOW THROUGH MULTISTAGE TURBOMACHINES TAKING INTO ACCOUNT FLOW LOSSES AND HEAT FLUXES [BERECHNUNG DER STROEMENG DURCH: MEHRSTUFIGE TURBOMASCHINEN UNTER BERUECK-

SICHTIGUNG VON STROEMUNGSVERLUSTEN UND WAERMEFLUESSEN]
W. Braig *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 557-594 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation,* and *19 Spacecraft Instrumentation.*

N83-34272* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SCANNING SEISMIC INTRUSION DETECTION METHOD AND APPARATUS Patent
Robert D. Lee, inventor (to NASA) Issued 15 Feb. 1983 8 p Filed 28 Jan. 1981 Supersedes N81-19430 (19 - 10, p 1350)
(NASA-Case-ARC-11317-1; US-Patent-4,374,378; US-Patent-Appl-SN-229231; US-Patent-Class-340-566; US-Patent-Class-340-518) Avail: US Patent and Trademark Office CSCL 14B

An intrusion monitoring system includes an array of seismic sensors, such as geophones, arranged along a perimeter to be monitored for unauthorized intrusion as by surface movement or tunneling. Two wires lead from each sensor to a central monitoring station. The central monitoring station has three modes of operation. In a first mode of operation, the output of all of the seismic sensors is summed into a receiver for amplification and detection. When the amplitude of the summed signals exceeds a certain predetermined threshold value an alarm is sounded. In a second mode of operation, the individual output signals from the sensors are multiplexed into the receiver for sequentially interrogating each of the sensors.
Official Gazette of the U.S. Patent and Trakemark Office

N83-34273*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AUTO COVARIANCE COMPUTER Patent Application
Timothy E. Hepner and James L. Meyers, inventors (to NASA) Filed 16 Aug. 1983 12 p
(NASA-Case-LAR-12968-1; US-Patent-Appl-SN-523560) Avail: NTIS HC A02/MF A01 CSCL 14B

A laser velocimeter covariance processor which calculates the auto covariance and cross covariance functions for a turbulent flow field based on Poisson sampled measurements in time from a laser velocimeter is described. The device will process a block of data that is up to 4096 data points in length and return a 512 point covariance function with 48-bit resolution along with a 512 point histogram of the interarrival times which is used to normalize the covariance function. The device is designed to interface and be controlled by a minicomputer from which the data is received and the results returned. A typical 4096 point computation takes approximately 1.5 seconds to receive the data, compute the covariance function, and return the results to the computer. NASA

N83-34274# Idaho National Engineering Lab., Idaho Falls. Instrument Development Branch.
SOME APPLICATIONS OF HOLOGRAPHY AT THE IDAHO NATIONAL ENGINEERING LABORATORY
Vance A. Deason 1982 8 p refs Presented at the 26th Tech. Symp. and Exhibition of the Intern. Soc. for Opt. Eng., San Diego, Calif., 22-27 Aug. 1982 Submitted for publication
(Contract DE-AC07-76ID-01570)
(DE83-001316; EGG-M-14982; CONF-820822-13) Avail: NTIS HC A02/MF A01

A project was recently completed that investigated possible uses of holography in the nuclear reactor safety program. A portable holographic camera which uses a pulsed ruby laser for illumination was constructed and used in various studies, including several designed to clarify the properties of steam/water mixtures that occur during loss-of-coolant accidents in nuclear reactors. The flexibility of the camera's optical configuration also enables it to produce holographic interferograms, which have several advantages over conventional interferograms and which can be used to measure very small physical changes in a given environment.DOE

N83-34275*# National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.
DETERMINING THE OPERATING CHARACTERISTICS OF AN ULTRAVIOLET INTERFEROMETRIC SPECTROMETER
C. L. Parsons Jul. 1983 43 p refs
(NASA-TM-84420; NAS 1.15:84420) Avail: NTIS HC A03/MF A01 CSCL 14B

A prototype interferometric spectrometer system is being built by NASA to explore the potential of the technique for applications involving the visible and near ultraviolet portions of the electromagnetic spectrum. The system is limited only by the frequency bandpass of the optical components used in the system, the quality of the optical components, and ultimately by the memory capacity of the computer; tradeoffs between the wavenumber resolution of the produced spectrum, the bandpass limits of the optics, and the number of samples obtained from the interferogram must be delineated explicitly. The prototype Ultraviolet Interferometric Spectrometer (UVIS) instrument is expected to be configured several different ways to ascertain its suitability for various applications. To exploit its inherent flexibility, this reference document describes these parameter tradeoffs. Author

N83-34276*# National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.
BALLOON-BORNE PRESSURE SENSOR PERFORMANCE EVALUATION UTILIZING TRACKING RADARS
G. A. Norcross and R. L. Brooks Jun. 1983 64 p
(Contract NAS5-26930)
(NASA-CR-168345; NAS 1.26:168345) Avail: NTIS HC A04/MF A01 CSCL 14B

The pressure sensors on balloon-borne sondes relate the sonde measurements to height above the Earth's surface through the hypsometric equation. It is crucial that sondes used to explore the vertical structure of the atmosphere do not contribute significant height errors to their measurements of atmospheric constituent concentrations and properties. A series of radiosonde flights was conducted. In most cases, each flight consisted of two sondes attached to a single balloon and each flight was tracked by a highly accurate C-band radar. For the first 19 radiosonde flights, the standard aneroid cell baroswitch assembly used was the pressure sensor. The last 26 radiosondes were equipped with a premium grade aneroid cell baroswitch assembly sensor and with a hypsometer. It is shown that both aneroid cell baroswitch sensors become increasingly inaccurate with altitude. The hypsometer radar differences are not strongly dependent upon altitude and it is found that the standard deviation of the differences at 35 km is 0.179 km. E.A.K.

N83-34277*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DEVELOPMENT OF A NUCLEAR TECHNIQUE FOR MONITORING WATER LEVELS IN PRESSURIZED VEHICLES
Jay J. Singh, William T. Davis (Computer Sciences Corp., Hampton, Va.), and Gerald H. Mall Sep. 1983 35 p refs
(NASA-TM-85651; L-15642; NAS 1.15:85651) Avail: NTIS HC A03/MF A01 CSCL 14B

A new technique for monitoring water levels in pressurized stainless steel cylinders was developed. It is based on differences in attenuation coefficients of water and air for Cs137 (662 keV) gamma rays. Experimentally observed gamma ray counting rates

with and without water in model reservoir cylinder were compared with corresponding calculated values for two different gamma ray detection theshold energies. Calculated values include the effects of multiple scattering and attendant gamma ray energy reductions. The agreement between the measured and calculated values is reasonably good. Computer programs for calculating angular and spectral distributions of scattered radition in various media are included. Author

N83-34278*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A HOLOGRAPHIC INTERFEROMETRY TECHNIQUE FOR MEASURING TRANSONIC FLOW NEAR A ROTOR BLADE
John K. Kittleson Aug. 1983 24 p refs
(NASA-TM-84405; A-9432; NAS 1.15:84405; USAAVRADCOM-TR-83-A-10) Avail: NTIS HC A02/MF A01 CSCL 14E

A technique that uses holographic interferometry to record the first interferograms of the flow near a hovering transonic rotor blade is presented. A pulsed ruby laser is used to record interferograms of a 2 ft diam field of view near a rotor tip operating at a tip Mach number of 0.90. Several interferograms, recorded along planes perpendicular to the rotor's tip path plane at various azimuth angles around the flow, are presented. These interferograms yield quantitative information about shock structure and location, flow separation, and radiated noise that will help helicopter researchers understand the complexities of the flow around high speed rotor blades and thus improve performance and reduce noise. E.A.K.

N83-34279# Cranfield Inst. of Tech., Bedfordshire (England). Aerodynamics Div.
A NOTE ON THE ALGEBRAIC REPRESENTATION OF THE PRESTON TUBE CALIBRATION
D. I. A. Poll Mar. 1983 11 p refs
(CAR-8308; ISBN-0-902937-83-9) Avail: NTIS HC A02/MF A01

Algebraic expressions are presented for the full range of the Preston tube calibration. Unlike the original formulas presented by Patel, the present expressions are continuous throughout the range of validity with maximum deviation of 1.6% from Patel's results. In addition the variables are cast in natural logarithmic form to facilitate their use on those minicomputers which recognize the BASIC language. Author

N83-34280# HSS, Inc., Bedford, Mass.
THE DEVELOPMENT OF A TACTICAL DUAL-WAVELENGTH NEPHELOMETER Final Report, 27 Feb. 1981 - 30 Sep. 1982
D. F. Hansen and H. S. Stewart 24 Nov. 1982 187 p refs
(Contract F19628-81-C-0008)
(AD-A126676; AFGL-TR-82-0374; HSS-B-093) Avail: NTIS HC A09/MF A01 CSCL 14/2

A prototype dual-wavelength nephelometer operating at 0.55 micrometers and 2.5 micrometers was designed and fabricated. Limited testing was conducted in an environmental test chamber. The ultimate goal is to utilize these nephelometric measurements to infer atmospheric attenuation in the 8-12 micrometers region; preliminary attempts using available models and some published field-test data were made to develop algorithms for this purpose. However, the general unavailability of adequate atmospheric data bases containing extinction and scattering coefficients at the wavelengths of interest prevents definitive conclusions to be made. In addition, until field tests of the nephelometer are made, a complete evaluation of the nephelometer itself cannot be forthcoming. Author

N83-34281# Naval Ship Research and Development Center, Bethesda, Md. Ship Performance Dept.
PRODUCTION OF HOT-WIRES Final Report
Stuart C. Dickinson Apr. 1983 22 p refs
(SR0230101)
(AD-A128217; DTNSRDC/SPD-1079-01) Avail: NTIS HC A02/MF A01 CSCL 05/2

Several methods for producing hot-wire probes are described. Discussion includes the manufacture of probe bodies, soldering plated wires to the prongs etching Walaston type wires, and finishing the probe. This report is written as an instruction manual for researchers who desire to produce or repair their own sensors. Author (GRA)

N83-34282# Defence Research Establishment, Ottawa. (Ontario).
CADMIUM TELLURIDE DETECTORS FOR GAMMA DOSE-RATE METERS
S. McGowan Mar. 1982 28 p refs
(AD-A128190; DREO-859) Avail: NTIS HC A03/MF A01 CSCL 20/8

The response of a 0.25-mm CdTe detector has been calculated for photon energies ranging from 0.06 to 5.0 MeV using the computer code CYLTRAN. Results show that the response is highly energy dependent, varying by almost three decades over this energy range. The response also depends significantly on the amount of scattering material adjacent to the detector. Some additional calculations show that the response can be made more uniform by using a lead/tin filter and by employing more than one energy-discrimination level, but good uniformity of response is difficult to achieve. At 2 MeV a response of 2.1 x 10.7 counts/(mm squared gray) was found which is essentially the same as for silicon of equivalent thickness. Measurements with a commercial CdTe detector confirmed the results of the calculations, although comparison of measured and calculated results indicated that the detector was not as thick as its specified 0.25 mm. GRA

N83-34283# Army Engineer Topographic Labs., Fort Belvoir, Va.
TERRAIN ANALYSIS DATABASE GENERATION THROUGH COMPUTER-ASSISTED PHOTO INTERPRETATION
Daniel L. Edwards 1983 17 p refs Presented at the ACSM-ASP Convention, Washington, D.C., 13-18 Mar. 1983
(AD-A128187; ETL-R044) Avail: NTIS HC A02/MF A01 CSCL 09/2

The creation of digital terrain analysis databases through on-line photo interpretation has been the focus of computer-assisted photo interpretation research (CAPIR) at USAETL. An APPS IV analytical plotter equipped with stereo superposition linked to a minicomputer is used for photo interpretation and digitizing. Digital data is input in arc/node format with attributes and the points are stored in three dimensions; latitude, longitude, and elevation. To demonstrate these capabilities, high-altitude infrared photography of the Fort Belvoir, Virginia, area was used for photo interpretation and digitization, supplemented by large-scale photography and field data. Landforms, surface drainage, soils, and vegetation were individually interpreted and digitized. Digital elevations, measured from stereo imagery, were used to produce contour and slope overlays. The resultant digital database was readily accessed and used as a basis for analysis and modeling. This paper briefly describes the hardware, software and methods used to generate a digital terrain analysis database. GRA

N83-34284# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
SIMULTANEOUS PROCESSING OF PHOTOGRAPHIC AND ACCELERATOR ARRAY DATA FROM SLED IMPACT EXPERIMENT
Michael E. Ash Wright-Patterson AFB, Ohio Air Force Aerospace Medical Research Lab. Dec. 1982 91 p refs
(Contract F33615-76-C-0520; AF Proj. 7231)
(AD-A128100; AFAMRL-TR-82-73) Avail: NTIS HC A05/MF A01 CSCL 06/19

A Quaternion-Kalman filter model is derived to simultaneously analyze accelerometer array and photographic data from sled impact experiments. Formulas are given for the quaternion representation of rotations, the propagation of dynamical states and their partial derivatives, the observables and their partial derivatives, and the Kalman filter update of the state given the observables. The observables are accelerometer and tachometer velocity data of the sled relative to the track, linear accelerometer array and photographic data of the subject relative to the sled, and ideal angular accelerometer data. The quaternion constraints enter through perfect constraint observations and normalization

after a state update. Lateral and fore-aft impact tests are analyzed with FORTRAN IV software written using the formulas of this report. GRA

N83-34285# IBM Research Lab., San Jose, Calif.
THE USE OF HOLOGRAPHY TO INVESTIGATE REACTIONS FROM HIGHER EXCITED STATES. ACTION SPECTRUM OF THE SECOND-PHOTON STEP IN THE TWO-PHOTON DISSOCIATION REACTION OF CARBAZOLE
U. Schmitt and D. M. Burland 16 Dec. 1982 17 p refs
(Contract N00014-81-C-0418)
(AD-A128654; TR-3) Avail: NTIS HC A02/MF A01 CSCL 14/5

A holographic technique was used to investigate photochemistry that occurs from higher excited triplet states (i.e., T2, and above). Specifically, the two-photon dissociation of carbazole in poly(methyl methacrylate) films was investigated. The photochemical action spectrum of the second-photon step is found to be in good agreement with the carbazole triplet-triplet absorption spectrum. This implies that the quantum yield for photodissociation is independent of photon energy in this wavelength region. Author (GRA)

N83-34286# Defense Communications Engineering Center, Reston, Va. Transmission Engineering Directorate.
A PROPOSED STUDY PROGRAM FOR THE ENHANCEMENT OF PERFORMANCE OF CLOCKS IN THE DCS TIMING SYSTEM
H. A. Stover 31 Aug. 1982 33 p refs
(AD-A128858; DCEC-TN-7-82) Avail: NTIS HC A03/MF A01 CSCL 12/1

Communications System timing survivability can be enhanced by a backup freerunning clock capability, but this requires stable, accurate clocks. Stable, accurate cesium clocks are very expensive. Following a calibration period, errors in less expensive quartz or rubidium clocks can most likely be predicted for a free-running period and removed from sufficient accuracy for an adequate length of time to satisfy many DCS requirements. Use of an Autoregressive Integrated Moving Average (ARIMA) model for this clock error prediction is discussed. Author (GRA)

N83-34287# Naval Research Lab., Washington, D. C.
SSM/I (SPECIAL SENSOR MICROWAVE/IMAGER) PROJECT Summary Report
James P. Hollinger and Robert C. Lo 20 Apr. 1983 111 p refs (W0524CC)
(AD-A128803; NRL-MR-5055) Avail: NTIS HC A06/MF A01 CSCL 17/9

The Special Sensor Microwave/Imager (SSM/I) is a passive microwave radiometric system designed to provide retrievals of the environmental parameters sea surface wind, precipitation, atmospheric moisture content, soil moisture and sea ice conditions. It is a joint Navy/Air Force project developed by the Hughes Aircraft Company under the direction of the Navy Space System Activity (NSSA) and the Air Force Space Division to be flown on the Defense Meteorological Satellite Program (DMSP). The Space Sensing Applications Branch of the Naval Research Laboratory has served as a technical consultant to NSSA beginning in fiscal year 1982. A summary description of the SSM/I instrument; and descriptions of the geophysical models, the interaction model, the retrieval technique and climatology used for the SSM/I environmental retrieval algorithm are presented. This information may serve as an introduction to the SSM/I for those individuals who have an interest in the SSM/I and its geophysical data products. The studies, conducted at the request of the NSSA to evaluate and investigate specific details of the instrument and algorithms are attached as Appendix A through E. Author (GRA)

N83-34288# Rockwell International Corp., Golden, Colo. Energy Systems Group.
CALIBRATION OF AND CONVERSION CHARTS FOR MATHESON ROTAMETERS
John P. Affatic and G. A. Riordan, ed. 9 May 1983 16 p
(Contract DE-AC04-76DP-03533)
(DE83-012431; RFP-3499) Avail: NTIS HC A02/MF A01

To establish uniformity in the calibration of Matheson Series 600 rotameters, a project was undertaken to collect and combine calibration data on rotameters of the same type. This also serves to eliminate the many individual charts that have been issued in the past and will help to avoid any confusion in the specification of float height and flow rate. Past calibration data, as well as new data, on rotameters of the same tube size, float material, and gas, was combined in a computer program utilizing the least squares method of curve fitting. The best fit curve was selected and a conversion chart of float height to flow rate was printed. The report includes a description of the calibration process and the error analysis involved. Since the finalization of the conversion charts and the assigning of tolerances, newly purchased rotameters have been calibrated and issued. All Matheson Series 600 rotameters are being calibrated to, and issued with, these standard charts. Author

N83-34289# Brookhaven National Lab., Upton, N. Y.
TRACK CHAMBERS FOR HIGH LUMINOSITY
T. Ludlam and E. D. Platner 1983 7 p refs Presented at the DFF Workshop on Collider Detectors: Present Capabilities and Future Possibilities, Berkeley, Calif., 28 Feb. - 4 Mar. 1983
(Contract DE-AC02-76CH-00016)
(DE83-011648; BNL-32788) Avail: NTIS HC A02/MF A01

The requirements for chambers as large solid angle tracking devices in a hadron collider at L 10 to the 33rd power sq cm/sec are examined. This luminosity corresponds to an event rate of 50 GHz, and an average charged particle density dm/dy -3.6 is assumed. The known performance of the axial field spectrometer drift chamber and the MPS 2 drift chamber system are taken as a starting point. The rate per wire should not exceed 2 MHz. The sensitive time of the chambers (i.e., maximum drift times) should be short enough to limit the coverage number of pile up events to not more than a few. DOE

N83-34290# California Univ., Livermore. Lawrence Livermore Lab. Chemistry and Materials Science Dept.
APPLICATION OF FAST INFRARED DETECTORS TO DETONATION SCIENCE
William G. VonHolle and Roy A. McWilliams 28 Jul. 1982 9 p refs Presented at the 26th Tech. Symp. and Exhibition of the Intern. Soc. for Opt. Eng., San Diego, Calif., 22-27 Aug. 1982
(Contract W-7405-eng-48)
(DE82-020168; UCRL-87363; CONF-820822-7) Avail: NTIS HC A02/MF A01

Infrared radiometers have been used to make time-resolved emission measurements of shocked explosives. Instruments of moderate time resolution were used to estimate temperatures in shocked but not detonated explosives. The heterogeneity of the shock-induced heating was discovered in pressed explosives by two-band techniques, and the time-resolved emittance or extent of hot spot coverage indicated a great dependence on shock pressures. Temperatures in moderately shocked organic liquids were also measured. Faster response radiometers with 5 ns rise times based on InSb and HgCdTe photovoltaic detectors were constructed and tested. Preliminary data on reactive shocks and detonations reveal a resolution of the heating in the shock wave and the following reaction. DOE

N83-34291# Argonne National Lab., Ill. Nondestructive Assay Section.
FIELD TEST OF THE BULK-ASSAY CALORIMETER
R. B. Perry and A. Keddar (International Atomic Energy Agency, Vienna) Oct. 1982 11 p
(Contract W-31-109-eng-38)
(DE83-005921; ANL-NDA-11) Avail: NTIS HC A02/MF A01

The Bulk-Assay Calorimeter was field tested at a mixed oxide fuel fabrication plant. Five containers of plutonium oxide feed stock used in the manufacture of mixed oxide LMFBR type fuel were assayed during the test. Electrical measurements to verify the calibration of the calorimeter were also made. DOE

N83-34292# Brookhaven National Lab., Upton, N. Y.
PHYSICS WITH THE AXIAL FIELD SPECTROMETER
1982 6 p refs Presented at the 21st Intern. Conf. on High Energy Phys., Paris, 26-31 Jul. 1982
(Contract DE-AC02-76CH-00016)
(DE83-005804; BNL-32161; CONF-820718-26) Avail: NTIS HC A02/MF A01

The Axial Field Spectrometer collaboration at the CERN Intersecting Storage Rings is engaged in a programme investigating deep inelastic hadron collisions with a detector system consisting of a cylindrical drift chamber, uranium/scintillator hadron calorimeters, liquid-argon calorimeters, and Cherenkov counters. The latter three devices are used for triggering on high-p/sub T/ hadron jets, direct gamma and pi 0, and identified charged hadrons, respectively. The spectrometer is briefly described. DOE

N83-34293# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
ADVANCED MASS SPECTROMETERS FOR HYDROGEN-ISOTOPE ANALYSES
Philippe Chastagner, Harold L. Daves, and W. Bascom Hess 1982 25 p Presented at the 9th Intern. Mass Spectrometry Conf., Vienna, 30 Aug. - 3 Sep. 1982
(Contract DE-AC09-76SR-00001)
(DE83-004930; DP-MS-81-115; CONF-820883-2) Avail: NTIS HC A02/MF A01

Two advanced mass spectrometers for the accurate analysis of mixtures of the hydrogen isotopes were evaluated. One is a large double-focusing instrument with a resolution of 2000 at mass 4 and an abundance sensitivity of > 100,000 for the HT-D2 doublet. The second is a smaller, simpler, stigmatic focusing instrument with exceptionally high ion intensities (> 1 x one billionth A at 600 resolution and about one ten-billionth A at 1300 resolution) for high signal to noise ratios. Both instruments are computer controlled. Once a scan is started, peak switching, scanning, mass discrimination control, data collection, and data reduction are done without operator intervention. Utility routines control hysteresis effects and instrument calibration. A containment facility, with dual inlet systems and a standard distribution system, permits testing with tritium mixtures. Author

N83-34294# Los Alamos Scientific Lab., N. Mex.
POTENTIAL APPLICATION OF A SINGLE-PARTICLE AEROSOL SPECTROMETER FOR MONITORING AEROSOL SIZE AT THE DOE FILTER TEST FACILITIES
G. C. Salzman, H. J. Ettinger, M. I. Tillery, L. D. Wheat, and W. K. Grace 1982 14 p refs Presented at 17th DOE Nucl. Air Cleaning Conf., Denver, 1 Aug. 1982
(Contract W-7405-eng-36)
(DE82-019557; LA-UR-82-2090; CONF-820833-2) Avail: NTIS HC A02/MF A01

A commercial single particle aerosol spectrometer, the LAS-X, was used to demonstrate that the test aerosol produced by each of the Q107 high efficiency particulate air filter test systems was polydisperse with a geometric standard deviation greater than 1.35, and a geometric mean diameter less than 0.2 microns. Use of the LAS-X for monitoring aerosol size was evaluated. The LAS-X is relatively insensitive to changes in aerosol concentration and refractive index over the range of interest for filter testing. It appears that the LAS-X would provide a better instrument for monitoring aerosol size, and would permit the test operator to adjust the test aerosol to approximate the size characteristics recommended for this test. DOE

N83-34295# Sandia Labs., Albuquerque, N. Mex.
EVALUATION OF A RACETRACK MICROTRON FOR HIGH-ENERGY RADIOGRAPHY
R. Morris and J. R. London 1982 7 p refs
(Contract DE-AC04-76DP-00789)
(DE82-008189; SAND-82-0534C) Avail: NTIS HC A02/MF A01

A series of tests was conducted on the 50-MeV-racetrack microtron at the Royal Institute of Technology in Stockholm, Sweden for the purpose of determining the quality of industrial radiographs generated by the bremsstrahlung beam of the machine. The results of the experiments indicate that radiographs with a spatial sensitivity better than those produced by more conventional high-energy bremsstrahlung sources can be produced on a microtron, the contrast sensitivity of the microtron is about 50% less than a linatron and betatron operated at the same energy, and the dose/pulse is sufficient for cine-radiography at frame rates up to 300 frames/s. DOE

N83-34296# California Univ., Los Angeles. Dept. of Earth and Space Sciences.
DIGITAL DATA-ACQUISITION SYSTEM FOR USE WITH A PROTON-PRECESSION BASE-STATION MAGNETOMETER
R. L. McPherron 26 Aug. 1982 17 p
(Contract DE-AT03-79ER-10119)
(DE83-010237; DOE/ER-10119/T2) Avail: NTIS HC A02/MF A01

At UCLA the base station magnetometer is a Scintrex MB-2 which uses a two inch wide chart record scaled to 100 nT. The magnetometer is also equipped with a digital readout. A block diagram of the data acquisition system is presented. The microcomputer utilizes a R6502 as the central processor. Data are entered into the computer via a 12 key keypad and are displayed on a 6 digit liquid crystal display. Data from the Scintrex base magnetometer is passed to the microcomputer via a 37 line connector. One line of this connector is used to signal the status of the internally controlled sampling circuit in the base station magnetometer. Digital data are stored temporarily in random access memory until an output buffer is filled. When this occurs power is applied to the audio cassette tape transport mechanism and after a short delay a block of data is written onto tape. The tape interface implements the Kansas City standard which is nearly universally used for microcomputer recording on audio cassette recorders. DOE

N83-34297# Department of Energy, New York. Environmental Measurements Lab.
INTERCOMPARISON OF AEROSOL INSTRUMENTS: NUMBER CONCENTRATION
E. O. Knutson, D. Sinclair, K. W. Tu, L. Hinchliffe, and H. Franklin May 1982 193 p refs
(DE82-015718; DOE/EML-403) Avail: NTIS HC A09/MF A01

An intercomparison of aerosol measuring instruments focused on five instruments: the Pollak and TSI condensation nucleus counters; the Active Scattering Aerosol Spectrometer (ASAS-X); and two aerosol electrometers. Test aerosols of sodium chloride and ammonium fluorescein generated by nebulization/electrostatic classification were used to obtain 195 lines of comparison data. Concentrations measured by the ASAS-X and the TSI aerosol electrometer averaged respectively 1.388 and 1.581 times that measured by the Pollak. These ratios were very stable during the week and there was little effect of particle size or material. Most other comparisons were equally stable. However, a review of past work led to the disturbing conclusion that these ratios may change from year to year, or from season to season. A filter sample was taken from microscopy, concurrent with readings from the ASAS-X and the TSI condensation nucleus counters. In this sample, the two instruments differed by 20%. Within its 20% uncertainty, the filter result matched both the TSI and ASAS-X readings. DOE

N83-34298# Sandia Labs., Albuquerque, N. Mex. Test Measurements, Facilities and TM Mechanical Design Div.
SYSTEMS APPROACH TO MEASURING SHORT-DURATION ACCELERATION TRANSIENTS
Frederick Schelby 1983 29 p refs Presented at the 12th Transducer Workshop, Melbourne, Fla., 7 Jun. 1983
(Contract DE-AC04-76DP-00789)
(DE83-011499; SAND-82-1730C; CONF-830639-1) Avail: NTIS HC A03/MF A01

A shock measurement system was developed in which the quartz seismic system, two poole active filter and an FET source follower are incorporated in a transducer housing. It is shown that the system will survive + or 100,000g without damage. The PCB

can supply different ranges as required. The PCB Model 305M23, can obtain data comparable to those of standard piezoelectric and piezoresistive accelerometers when high frequencies are absent. In the presence of high frequency stimuli, the accelerometer has obtained data without over ranging its data channel and without introducing error signals from excitation of the resonant frequency of its seismic system. It is useful for impact and pyrotechnic measurements. The development effort and test program have enhanced the probability of acquiring successful structural measurements in harsh mechanical loading environments. DOE

N83-34299# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.
A NEW MEASUREMENT METHOD OF THE NOISE PARAMETERS OF TWO-PORT DEVICES
N. Fanelli 1983 5 p refs Presented at 1983 IEEE/MTT-S Intern. Microwave Symp., Boston, 1-3 Jun. 1983
(CISE-2006) Avail: NTIS HC A02/MF A01

Available noise power is detected at device output with a sliding short circuit connected to its input terminals to determine the four noise parameters. Conventional methods suffer from inaccuracies due to the quality of the turners employed. In the method described a relationship is found between the device input impedance and the optimum source impedance for minimum noise figure. The experimental setup and measuring results in the 8 to 11 GHz band are described. Author (ESA)

N83-34300# Stockholm Univ. (Sweden). Inst. of Physics.
A 3 m VACUUM SPECTROGRAPH WITH FIXED SCATTERINGS
P. Bollmark, I. Kopp (Linkoeping Univ., Sweden), and K. Schmidt Jun. 1983 20 p refs
(USIP-83-06) Avail: NTIS HC A02/MF A01

A 3 m grating spectrograph with a conventional Eagle mounting, except that fixed settings are used for the orientation of the grating and the plate holder, was built. The vacuum system, slit, grating mounting, plate holder, and light source connection are described. Operating instructions are given. The spectrograph can be used in the first order from 400 to 8000 A. Dispersion is between 2.61 and 2.78 A/mm. Author (ESA)

N83-34301# Oxford Univ. (England). Dept. of Engineering Science.
THE CONE PENETROMETER WITH PORE PRESSURE MEASUREMENT
R. E. May 1983 96 p refs
(OUEL-1473/83; SM-040/83) Avail: NTIS HC A05/MF A01

Piezocone design, field and laboratory testing, cone penetrometer analyzis in clay, and rate effects are discussed. Correction of readings, soil type, undrained shear strength from cone resistance and from excess pore pressures, overconsolidation ratio, and hydraulic characteristics are covered. Author (ESA)

N83-34302# Cornell Univ., Ithaca, N.Y. School of Chemical Engineering.
HEAT-OF-MIXING APPARATUS FOR LIQUEFIED GASES Final Report, Nov. 1980 - Oct. 1982
W. B. Streett and J. A. Zollweg Nov. 1982 18 p refs Sponsored by Gas Research Inst.
(PB83-194902; GRI-82/0031) Avail: NTIS HC A02/MF A01 CSCL 14B

A heat of mixing apparatus for measuring heats of mixing of liquefied gases has been designed and built. It has been tested by measuring the heats of mixing of liquid nitrogen and oxygen and 77.3 K. Additional heat of mixing experiments were performed on the systems carbon dioxide-ethane and ethane-propane. GRA

N83-34303# Unisearch Associates, Inc., Concord (Ontario).
MEASUREMENT OF NO, NO2 AND HNO3 USING A TUNABLE DIODE LASER SYSTEM. FIRST YEAR REPORT. PHASE 1: DEVELOPMENT AND FIELD STUDY
G. I. Mackay, T. Iguchi, and H. I. Schiff 5 Nov. 1982 196 p Sponsored by Coordinating Research Council, Inc., Atlanta, Ga.
(PB83-186544) Avail: NTIS HC A09/MF A01 CSCL 14B

A tropospheric air monitoring system (TAMS) was developed by UNISEARCH ASSOCIATES INC. under contract to the CRC CAPA-19-80 program. The TAMS uses the principle of infrared absorptions which can, in principle, be used for the majority of atmospheric trace gases. It combines the high selectivity of a tunable diode spectrometer with the sensitivity of long path absorption provided by a White cell. The system developed under this contract was for manual operation and data was retrieved from a strip chart recorder. GRA

36 LASERS AND MASERS

Includes parametric amplifiers.

N83-34304* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SIDELOOKING LASER ALTIMETER FOR A FLIGHT SIMULATOR Patent
Larry D. Webster, inventor (to NASA) Issued 5 Jul. 1983 17 p Filed 13 Feb. 1981 Supersedes N81-19439 (19 - 10, p 1351)
(NASA-Case-ARC-11312-1; US-Patent-4,391,514; US-Patent-Appl-SN-234224; US-Patent-Class-356-1; US-Patent-Class-356-4; US-Patent-Class-358-104; US-Patent-Class-358-109; US-Patent-Class-434-4; US-Patent-Class-434-38) Avail: US Patent and Trademark Office CSCL 20E

An improved laser altimeter for a flight simulator which allows measurement of the height of the simulator probe above the terrain directly below the probe tip is described. A laser beam is directed from the probe at an angle theta to the horizontal to produce a beam spot on the terrain. The angle theta that the laser beam makes with the horizontal is varied so as to bring the beam spot into coincidence with a plumb line coaxial with the longitudinal axis of the probe. A television altimeter camera observes the beam spot and has a raster line aligned with the plumb line. Spot detector circuit coupled to the output of the TV camera monitors the position of the beam spot relative to the plumb line.
Official Gazette of the U.S. Patent and Trademark Office

N83-34305 Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia). Div. of Atmospheric Research.
MEASUREMENTS OF THE TRACE COMPOSITION OF THE AUSTRAL STRATOSPHERE: CHEMICAL AND METEOROLOGICAL DATA
I. E. Galbally, C. R. Roy, R. S. OBrien, B. A. Ridley (York Univ., Downsview, Ontario), D. R. Hastie (York Univ., Downsview, Ontario), W. F. J. Evans (Atmospheric Environment Service, Downsview, Ontario), C. T. McElroy (Atmospheric Environment Service, Downsview, Ontario), J. B. Kerr (Atmospheric Environment Service, Downsview, Ontario), P. Hyson, W. Knight et al Melbourne 1983 35 p refs
(CSIR-TP-1; ISBN-0-643-03521-4) Copyright. Avail: Issuing Activity

Between March and October 1979 eleven balloon flights were conducted to study the trace composition of the southern hemisphere stratosphere using launch sites at Alice Springs 23 deg S and Mildura 34 deg S in Australia. Balloon-borne measurements of NO, NO2, HNO3, O3, N2O, CCL3F, H2O, CH4, particles and various meteorological parameters along with ground based total (column density) O3 and NO2 measurements are presented.
Author

N83-34306*# Old Dominion Univ., Norfolk, Va. Dept. of Physics.
THEORETICAL STUDIES OF SOLAR-PUMPED LASERS Progress Report, 16 Jan. - 15 Jul. 1983
Wynford L. Harries Jul. 1983 38 p refs
(Grant NsG-1568)
(NASA-CR-173016; NAS 1.26:173016; PTR-83-4) Avail: NTIS

HC A03/MF A01 CSCL 20E

Metallic vapor lasers of Na2 and Li2 are examined as solar energy converters. The absorbed photons cause transitions to vibrational-rotational levels in an upper electronic state. With broad band absorption the resultant levels can have quantum numbers considerably higher than the upper lasing level. The excited molecule then relaxes to the upper lasing level which is one of the lower vibrational levels in the upper electronic state. The relaxation occurs from collisions, provided the molecule is not quenched into the ground level electronic state. Lasing occurs with a transition to a vibrational level in the lower electronic state. Rough estimates of solar power efficiencies are 1 percent for Na2 and probably a similar figure for Li2. The nondissociative lasers from a family distinct from materials which dissociate to yield an excited atom. Author

N83-34307*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

MINI-CAVITY-DUMPED LASER Final Report, Sep. 1980 - Sep. 1981

Ed Reed Dec. 1981 46 p refs Presented at the Lasers '81 Conf., New Orleans, Dec. 1981

(Contract NAS5-26224)

(NASA-CR-170569; NAS 1.26:170569) Avail: NTIS HC A03/MF A01 CSCL 20E

Lasers for use in high precision satellite ranging systems consist typically of an oscillator followed by several amplifier stages. While the shortest optical pulses are achieved by using a mode locked oscillator, such an oscillator is incompatible with the compact design needed in future, highly mobile systems. The laser oscillator achieves pulse lengths approaching those obtainable by mode locking, but in a much more compact and stable design. The oscillator uses two LiNbO3 Pockels cells inside the resonator. One Q-switches the oscillator, and the other is used in a pulse slicing scheme to cavity dump a portion of the circulating optical energy. The length of the optical output pulse measured at 425 + or - 50 picoseconds. E.A.K.

N83-34308# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.

F SUB 2 BOUNDARY LAYER MEASUREMENT IN A CHEMICAL LASER SLIT NOZZLE FLOW

D. J. Spenser, D. A. Durran, H. A. Bixler, and R. L. Varwig 15 Feb. 1983 28 p refs

(Contract F04701-82-C-0083)

(AD-A126611; SD-TR-83-09; TR-0083(3930-01)-2) Avail: NTIS HC A03/MF A01 CSCL 20/5

A sensitive F2 absorption diagnostic suitable for slit nozzle scanning was developed and applied to the measurement of an F2 boundary layer in an HF chemical laser flow. The F2 boundary layer profile was determined to be of exponential decay form with peak at the nozzle wall and of width approx. 1/3 the viscous boundary layer. The F2 concentration profile was displaced inwardly and slightly compressed by the H2 slit injection at the nozzle exit plane. The F2 profile apparently remains fairly intact in passing through the lasing zone. B.W.

N83-34309# Defense Intelligence Agency, Washington, D.C. Directorate for Scientific and Technical Intelligence.

BIBLIOGRAPHY OF SOVIET LASER DEVELOPMENTS, NO. 57, JANUARY - FEBRUARY 1982

2 Mar. 1983 154 p

(AD-A126620; DST-2700Z-003-83) Avail: NTIS HC A08/MF A01 CSCL 05/2

The Soviet Laser Bibliography is a continuing series on Soviety laser development. The coverage includes basic research on solid state, liquid, gas, and chemical lasers; components; nonlinear optics; spectroscopy of laser materials; ultrashort pulse generation; crystal growing, theoretical aspects of advanced lasers; and general laser theory. Laser applications are listed under biological effects; communications; beam propagation; computer technology; holography, laser-induced chemical reactions; measurement of laser parameters; laser measurement applications, laser-excited optical effects; laser spectroscopy; beam-target interaction; and plasma generation and diagnostics. GRA

N83-34310# Portland State Univ., Oreg. Dept. of Mechanical Engineering.

LIQUID TRANSMISSION LINE PULSER CIRCUIT FOR LASER EXCITATION Final Report

George A. Tsongas Jan. 1983 151 p refs

(Contract N00014-77-C-0589)

(AD-A126720) Avail: NTIS HC A08/MF A01 CSCL 10/2

Liquid dielectric transmission lines and their potential application as a reliable excitation source in high power, high repetition rate laser designs are studied. The design problems associated with the construction of high repetition rate (khz), short wavelength lasers was reviewed and the major shortcomings of conventional electrical driving circuits identified. The identification of these shortcomings and a review of the available literature on electrical circuits for various types of lasers suggested that liquid dielectrics and transmission lines could potentially have significant advantages over more conventional circuitry used in high repetition rate, short wavelength lasers. Use of this excitation source for laser pumping is expected to result in major performance improvements with regard to high average power, high repetition rate operation, high wall-plug efficiency, and high reliability. GRA

N83-34311# Air Force Academy, Colo.

CHEMICAL GENERATOR AND EPR STUDIES OF THE CHEMICAL-OXYGEN-IODINE-LASER SYSTEM

C. J. Dymek, Jr., M. E. Cummings, D. W. Stoner, L. P. Davis, and J. W. Fox Mar. 1983 34 p refs

(AF Proj. 2303)

(AD-A126776; FJSRL-TR-83-0003) Avail: NTIS HC A03/MF A01 CSCL 20/5

Formation of O2 (supra 1 delta) by reaction of Cl2 gas with basic H2O2 liquid was studied using a small scale batch reactor. Effect on O2 (supra 1 delta) yield of certain reaction/reactor parameters were evaluated. Parameters included molarity of base and presence of Cl (-) initial reaction solution, use of Br2 as reactant, depth of Cl2 injector in solution area of cooled trap surface, and use of halocarbon coating on flow tube walls. Use of Cl2, base molarity, and trap conditions were areas in which greatest effects were observed. Mixture of argon and I2 were added to the flowing output from the generator and the high field (1.7 to 2.4T) EPR spectrum was scanned. No I2 or I species were observed. Values of g (sub exp) for two previously unreported EPR lines in the J=3 level of O2 (supra 1 delta) were obtained. Author

N83-34312# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ELECTRON CIRCUITS: SEMICONDUCTOR LASER MULTIPLE USE INSTALLATION

Fangming Zhou, Jinsheng Fan, and Deyuan Weng 7 Apr. 1983 15 p Transl. into ENGLISH from Dianzi Jishu (China), no. 7, 1983 p 41-43

(AD-A128271; FTD-ID(RS)T-0096-83) Avail: NTIS HC A02/MF A01 CSCL 20/5

A light source for a multiple use installation using a same matter junction or different matter junction GaAlAs/GaAs semiconductor laser, which has the advantages of high interference resistance, long transmission distance (tens to hundreds of meters), good security, and low power consumption; in addition, the controller of the light source has multiple usages of alarming, switching and counting is presented. The multiple use installation can be used in control of breaking warps and counting on roving waste machines, warping machines and silk weaving machines in the textile industry; long distance speed measurement, alarming and counting in machinery, electricity and chemical industries; and alarming and control of water levels in reservoirs, rivers and water towers, as well as blockade alarming and control of important divisions. This multiple use installation is composed of two parts a laser emitter and a receiving device. The former component is used to produce the laser; after the receiver receives the laser,

the installation completes operations of alarming, switching and counting. Author

N83-34313# Armament Systems, Inc., Anaheim, Calif.
ASSESSMENT OF SURVIVABILITY AGAINST LASER THREATS: THE ASALT-I COMPUTER PROGRAM Final Report
Frederick J. Steenrod and John E. Musch Sep. 1981 175 p
(Contract N00123-80-D-0033)
(AD-A128472; JTCG/AS-81-S-004) Avail: NTIS HC A08/MF A01 CSCL 20/5

ASALT-I is a FORTRAN computer program used to evaluate the effectiveness of a high-energy laser weapon against an aircraft flying a path previously evaluated for various encounter conditions. The laser weapon system is described by a flux emission function, aiming errors caused by jitter, and slewing limits of the tracking mechanism. The target aircraft is characterized by a set of components which are combined using a fault tree structure. The program output includes a summary for the whole mission which presents probabilities of kill for the total aircraft, its subgroups, and components. This manual contains descriptions for the mathematical concepts, the input requirements, and the output for the ASALT-I program. Author (GRA)

N83-34314# Armament Systems, Inc., Anaheim, Calif.
BENCHMARK FOR THE ASALT PROGRAM: ASSESSMENT OF SURVIVABILITY AGAINST LASER THREATS Final Report
Frederick John Steenrod and John E. Musch Sep. 1981 198 p refs
(Contract N00123-80-D-0033)
(AD-A128473; JTCG/AS-81-S-005) Avail: NTIS HC A09/MF A01 CSCL 20/5

The benchmark run of the ASALT Computer Program using data for an F-18 aircraft target is documented in this report. Also described in this report, are several other computer programs that are useful in assembling data for input to the ASALT Program. Copies of the input and output files from the benchmark process are included, so that the report serves as an example of the execution of the ASALT program and the programs which precede it. Author (GRA)

N83-34315# Air Force Systems Command, Wright-Patterson AFB, Ohio.
A MINIATURE NANOSECOND ELECTRON BEAM GENERATOR
Xiao Xiang Xie, Ruging Wang, Guohe Sha, and Cunhao Zhang 17 Mar. 1983 16 p Transl. into ENGLISH from Jiguang (China), v. 9, no. 1, 1982 p 12-16
(AD-A128060; FTD-ID(RS)T-0788-82) Avail: NTIS HC A02/MF A01 CSCL 10/2

The construction of a miniature nanosecond electron beam generator suitable for laser related kinetics studies is presented. The peak current of the electron beam measured behind a 6 mm diameter electron beam window is 7 amperes. The pulse duration (FW HM) is 6 to 8 nanoseconds and the maximum electron energy is about 107 keV. GRA

N83-34316# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
RECOMBINING PHOTODISSOCIATION IBr LASER IN A PULSE-REPETITION MODE
V. A. Dudkin, I. N. Knyazev, and V. I. Malyshev 12 Apr. 1983 9 p refs Transl. into ENGLISH from Kratkiye Soobshch. po Fiz. (USSR), no. 5, May 1970 p 32-37
(AD-A128250; FTD-ID(RS)T-0292-83) Avail: NTIS HC A02/MF A01 CSCL 20/5

The operation of an IBr laser under the conditions of relatively low repetition frequencies of the illumination pulses is studied. Certain peculiarities appeared in the laser operation which make it possible to draw a conclusion regarding the recombination processes in such a laser. GRA

N83-34317# Westinghouse Research and Development Center, Pittsburgh, Pa.
STUDY OF SHORT PULSE MERCURY BROMIDE LASER Final Report, 15 Mar. - 30 Nov. 1982
C. S. Liu, S. G. Leslie, and I. Liberman 14 Feb. 1983 16 p ref.
(Contract N00014-82-C-0318)
(AD-A128280) Avail: NTIS HC A02/MF A01 CSCL 20/5

This report summarizes research work performed at the Westinghouse R&D Center under ONR Contract No. N00014-82-C-0318 for the period between March 15, 1982 and November 30, 1982. The major effort was to perform experimental studies of the generation of a short laser pulse (< 10 ns) from a cavity dumped HgBr laser. In this report, we will describe a cavity dumped HgBr laser emitting 8 ns (FWHW) laser pulses with output energies of 11.5 mJ/pulse at a cavity dumping efficiency of 58%. Finally, we will discuss the problems related to the cavity dumping of a high energy HgBr laser and possible solutions to these problems. GRA

N83-34318# California Univ., Livermore. Lawrence Livermore Lab.
RECENT DEVELOPMENTS IN LASER GLASSES
M. J. Weber 1983 11 p refs Presented at the Intern. Conf. on Lasers, New Orleans, 13-17 Dec. 1982 Submitted for publication
(Contract W-7405-eng-48)
(DE83-006010; UCRL-87796; CONF-821203-3) Avail: NTIS HC A02/MF A01

Glass forming compositions including oxides, halides, oxyhalides, and chalcogenides are applicable to lasers and have greatly expanded the range of optical properties and spectroscopic parameters available to the laser designer. Many properties of interest for laser action transparency, linear and nonlinear refractive indices, and damage threshold of the host glass and the absorption spectrum, radiative and nonradiative transition probabilities, fluorescence wavelength, stimulated emission cross section, and spectroscopic inhomogeneities of the lasing ion Nd(3+) are reviewed. DOE

N83-34319# Brookhaven National Lab., Upton, N. Y. National Synchrotron Light Source.
DESIGN OF THE MAGNETIC STRUCTURE OF THE UNDULATOR FOR THE FREE ELECTRON LASER EXPERIMENT
A. Luccio and Li-hua Yue 1982 3 p Presented at the Free Electron Laser Conf., Bendor, France, 26 Sep. - 1 Oct. 1982
(Contract DE-AC02-76CH-00016)
(DE83-005319; BNL-32089; CONF-820988-5) Avail: NTIS HC A02/MF A01

The basic features of the magnetic field in the permanent magnet undulator for the free electron laser are described. The procedure used to measure the magnetic properties of each magnet field block and to arrange them properly in order to minimize the field integrals is also discussed. DOE

N83-34320# California Univ., Livermore. Lawrence Livermore Lab.
LINE-COINCIDENCE SCHEMES FOR PRODUCING LASER ACTION AT SOFT-X-RAY WAVELENGTHS
George F. Chapline 12 Jan. 1983 14 p refs Presented at the Winter Colloq. on Quantum Electronics, Snowbird, Utah, 12-14 Jan. 1983
(Contract W-7405-eng-48)
(DE83-007352; UCRL-88657; CONF-830127-1) Avail: NTIS HC A02/MF A01

Line coincidence schemes for producing laser action in the wavelength regime 100-30A are reviewed. Schemes involving pumping of 2 (FEMALE) 4 transitions in neon like ions are considered particularly attractive. DOE

N83-34321# Istituto Superiore di Sanita, Rome (Italy). Lab. di Fisica.
LASER RADIATION: GENERATION AND APPLICATIONS
M. Grandolfo and P. Vecchia 25 Nov. 1982 36 p refs In ENGLISH; ITALIAN summary Presented at the Course on Protect. against Non-Ionizing Radiations, Ispra, Italy, 8-12 Nov. 1982
(ISS-L-82/8; ISSN-0390-6493) Avail: NTIS HC A03/MF A01

The fundamental physical principles on which the emission of

laser radiation is based are described. The different types of laser systems are reviewed, together with the corresponding utilization sectors. Author (ESA)

N83-34322# Istituto Superiore di Sanita, Rome (Italy). Lab. di Fisica.
LASER RADIATION: MEASURING TECHNIQUES AND INSTRUMENTATION
M. Grandolfo and P. Vecchia 25 Nov. 1982 35 p refs In ENGLISH; ITALIAN summary Presented at the Course on Protect. against Non-Ionizing Radiations, Ispra, Italy, 8-12 Nov. 1982
(ISS-L-82/9; ISSN-0390-6493) Avail: NTIS HC A03/MF A01

Techniques for the measurement of parameters characterizing a laser beam are reviewed. Definition of hazards related to the utilization of laser sources is discussed. Features and limits of the main types of commercially available instruments are described. Author (ESA)

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N83-34323* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MAGNETIC BEARING AND MOTOR Patent
Philip A. Studer, inventor (to NASA) Issued 3 May 1983 8 p Filed 31 Mar. 1982 Supersedes N82-29603 (20 - 20, p 2832)
(NASA-Case-GSC-12726-1; US-Patent-4,381,375; US-Patent-Appl-SN-364093; US-Patent-Class-308-10) Avail: US Patent and Trademark Office CSCL 13I

A magnetic bearing for passively suspending a rotatable element subjected to axial and radial thrust forces is disclosed. The magnetic bearing employs a taut wire stretched along the longitudinal axis of the bearing between opposed end pieces and an intermediate magnetic section. The intermediate section is segmented to provide oppositely directed magnetic flux paths between the end pieces and may include either an axially polarized magnets interposed between the segments. The end pieces, separated from the intermediate section by air gaps, control distribution of magnetic flux between the intermediate section segments. Coaxial alignment of the end pieces with the intermediate section minimizes magnetic reluctance in the flux paths endowing the bearing with self-centering characteristics when subjected to radial loads. In an alternative embodiment, pairs of oppositely wound armature coils are concentrically interposed between segments of the intermediate section in concentric arcs adjacent to radially polarized magnets to equip a magnetic bearing as a torsion drive motor. The magnetic suspension bearing disclosed provides long term reliability without maintenance with application to long term space missions such as the VISSR/VAS scanning mirror instrument in the GOES program. J.M.S.

N83-34324*# Texas A&M Univ., College Station. Turbomachinery Labs.
THE SSME HPFTP INTERSTAGE SEALS: ANALYSIS AND EXPERIMENTS FOR LEAKAGE AND REACTION-FORCE COEFFICIENTS Supplementary Progress Report
Dara W. Childs 15 Jul. 1983 60 p refs
(Contract NAS8-33716)
(NASA-CR-170851; NAS 1.26:170851; Seal-2-83) Avail: NTIS HC A04/MF A01 CSCL 11A

An improved theory for the prediction of the rotordynamic coefficients of turbulent annular seals was developed. Predictions from the theory are compared to the experimental results and an approach for the direct calculation of empirical turbulent coefficients from test data are introduced. An improved short seal solution is shown to do a better job of calculating effective stiffness and damping coefficients than either the original short seal solution or a finite length solution. However, the original short seal solution does a much better job of predicting equivalent added mass coefficient. S.L.

N83-34325*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPARATIVE EVALUATION OF THREE SHAFT SEALS PROPOSED FOR HIGH PERFORMANCE TURBOMACHINERY
R. C. Hendricks 1982 13 p refs Presented at the Joint Lubrication Conf., Washington, D.C., 4-6 Oct. 1982; sponsored by ASME and American Society of Lubrication Engineers
(NASA-TM-83021; E-1457; NAS 1.15:83021) Avail: NTIS HC A02/MF A01 CSCL 11A

Experimental pressure profiles and leak rate characteristics for three shaft seal prototype model configurations proposed for the space shuttle turbopump were assessed in the concentric and fully eccentric, to point of rub, positions without the effects of rotation. The parallel-cylindrical configuration has moderate to good stiffness with a higher leak rate. It represents a simple concept, but for practical reasons and possible increases in stability, all such seals should be conical-convergent. The three-stepdown-sequential, parallel-cylindrical seal is converging and represents good to possible high stiffness when fluid separation occurs, with a significant decrease in leak rate. Such seals can be very effective. The three-stepdown-sequential labyrinth seal of 33-teeth (i.e., 12-11-10 teeth from inlet to exit) provides excellent leak control but usually has very poor stiffness, depending on cavity design. The seal is complex and not recommended for dynamic control. M.G.

N83-34326*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THERMAL ELASTOHYDRODYNAMIC LUBRICATION OF LINE CONTACTS
M. K. Ghosh (Banaras Hindu Univ.) and B. J. Hamrock Jun. 1983 30 p refs
(NASA-TM-83424; E-1617; NAS 1.15:83424) Avail: NTIS HC A03/MF A01 CSCL 11H

A numerical solution to the problem of thermal elastohydrodynamic lubrication of line contacts was obtained by using a finite difference formulation. The solution procedure consists of simultaneous solution of the thermal Reynolds equation, the elasticity equation, and the energy equation subject to appropriate boundary conditions. Pressure distribution, film shape, and temperature distribution were obtained for fully flooded conjunctions, a paraffinic lubricant, and various dimensionless speed parameters while the dimensionless load and materials parameters were held constant. Reduction in the minimum film thickness due to thermal effects (as a ratio of thermal to isothermal minimum film thickness) is given by a simple formula as a function of the thermal loading parameter Q: $H(min)/H(min,I) = 10/10 + Q(0.4)$. Plots of pressure distribution, film shape, temperature distribution, and flow are shown for some representative cases. M.G.

N83-34327*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
APPLICATION OF MODERN SURFACE ANALYTICAL TOOLS IN THE INVESTIGATION OF SURFACE DETERIORATION PROCESSES
Donald H. Buckley 1983 24 p refs Proposed for presentation at SURTEC - KONGRESS 83, Berlin, West Germany, 24-27 Oct. 1983
(NASA-TM-83452; E-1766; NAS 1.15:83452) Avail: NTIS HC A02/MF A01 CSCL 20K

Surface profilometry and scanning electron microscopy were utilized to study changes in the surface of polymers when eroded. The X-ray photoelectron spectroscopy (XPS) and depth profile analysis indicate the corrosion of metal and ceramic surfaces and reveal the diffusion of certain species into the surface to produce a change in mechanical properties. Ion implantation, nitriding and plating and their effects on the surface are characterized. Auger spectroscopy analysis identified morphological properties of coatings applied to surfaces by sputter deposition. M.G.

N83-34328# Materials Research Labs., Melbourne (Australia).
WELDING Al-Zn-Mg (7XXX SERIES) ALLOYS: A LITERATURE REVIEW
A. Romeyn Jun. 1983 22 p refs
(MRL-R-888; AR-003-301) Avail: NTIS HC A02/MF A01

The use of high strength aluminum alloys, especially the alloys of the 7xxx series, in the construction of light armoured vehicles, light weight bridging, and other equipment, is of interest to the designers of military equipment. However, in the use of alloys which exhibit the highest mechanical properties and provide superior ballistic protection a major problem was exposed. Stress corrosion cracking found to occur in both the parent plate and the welded joint. The physical metallurgy and stress corrosion cracking behavior of the alloys in the 7xxx series is studied. In particular the interrelation between, microstructure, environment, and stress state is examined. Alloys were improved by a better understanding of the effects of materials processing operations on the microstructure and residual stress state. Advances in welding techniques offer an opportunity to substantially reduce the residual stress level associated with welding thick sections. The technique of pulsed current metal inert gas (synergic) welding holds considerable promise. S.L.

N83-34329*# Spectra Research Systems, Inc., Huntsville, Ala.
BEARING TESTER DATA COMPILATION, ANALYSIS, AND REPORTING AND BEARING MATH MODELING Annual Report, Jul. 1982 - Jul. 1983
10 Aug. 1983 210 p refs
(Contract NAS8-34686)
(NASA-CR-170856; NAS 1.26:170856; SRS/SE-TR83-117) Avail: NTIS HC A10/MF A01 CSCL 13I

The Shaberth bearing analysis computer program was developed for the analysis of jet engine shaft/bearing systems operating above room temperature with normal hydrocarbon lubricants. It is also possible to use this tool to evaluate the shaft bearing systems operating in cryogenics. Effects such as fluid drag, radial temperature gradients, outer race misalignments and clearance changes were simulated and evaluated. In addition, the speed and preload effects on bearing radial stiffness was evaluated. The Shaberth program was also used to provide contact stresses from which contact geometry was calculated to support other analyses such as the determination of cryogenic fluid film thickness in the contacts and evaluation of surface and subsurface stresses necessary for bearing failure evaluation. This program was a vital tool for the thermal analysis of the bearing in that it provides the heat generation rates at the rolling element/race contacts for input into a thermal model of the bearing/shaft assembly. S.L.

N83-34330# Science Applications, Inc., McLean, Va.
REVIEW AND ASSESSMENT OF REDUCED EMISSIONS/CLEAN BURNING DIESEL ENGINES FOR INTEGRATION INTO THE ARMY INVENTORY Final Technical Report
J. M. Daugherty, R. A. Leimert, P. J. Murchland, D. M. Nagel, and R. H. Sievers 12 May 1983 265 p refs
(Contract DAAK70-81-D-0031)
(AD-A128408; SAI-84-170-WA) Avail: NTIS HC A12/MF A01 CSCL 21/7

This effort examines the availability of diesel engines having reduced emission/clean burning characteristics for potential trial in 4000 lb. capacity forklift trucks to be used in closed and semi-closed environments. The effort includes identification of substances which have been identified in diesel engine exhausts, health and safety considerations relating to those substances as established or recommended by U.S. and foreign governmental and professional agencies, and ranges of concentration of the substances which have been noted. Twenty-nine diesel engines which might be suited for use in 4000 (and 6000) lb. forklift trucks are characterized by manufacture-provided descriptive information and test data. A ranking scheme based on exhaust emissions and other parameters over a standardized work cycle was developed and applied to identify the candidate engines which appear most promising for the Army's application and, thereby, most appropriate for further testing. Analysis of the data did not identify a candidate engine suitable for use in a closed environment without precautions or limitations for human exposure. These questions are to be subjects of further analysis and empirical testing. GRA

N83-34331# California Univ., Livermore. Lawrence Livermore Lab. Dept. of Transportation Systems Research.
ANALYSIS AND COMPARISON OF AUTOMOTIVE-PROPULSION SYSTEMS
Ervin Behrin 1 Oct. 1982 24 p refs Presented at the Soc. of Automotive Engr. Congr., Detroit, 28 Feb. - 4 Mar. 1983
(Contract W-7405-eng-48)
(DE83-004306; UCRL-88233; CONF-830201-2) Avail: NTIS HC A02/MF A01

Automotive propulsion systems are analyzed and their specific energy and specific peak power in terms of mechanical energy delivered from the propulsion systems' energy conversion device are compared. The calculations account for losses due to the energy conversion process and include the masses of both the fuel (or energy storage device) and the energy conversion components. Values used in the comparisons range from the state of the art, or most probable forecasts of characteristics, to highly optimistic projections of device characteristics. On the basis of this analysis, the range and acceleration for passenger vehicles utilizing the various propulsion systems is estimated. The power boosted hybrid systems are also examined. DOE

N83-34332# California Univ., Livermore. Lawrence Livermore Lab. Transportation Systems Research Office.
ANALYSIS AND COMPARISON OF AUTOMOTIVE-PROPULSION SYSTEMS
Ervin Behrin 1 Oct. 1982 11 p refs Presented at the Soc. of Automotive Engr. Congr., Detroit, 28 Feb. - 4 Mar. 1983
(Contract W-7405-eng-48)
(DE83-003878; UCRL-88233-Rev-1; CONF-830201-2-Rev-1) Avail: NTIS HC A02/MF A01

A number of existing and proposed automotive-propulsion systems are analyzed and their specific energy and specific peak power in terms of mechanical energy delivered from the propulsion system's energy-conversion device are compared. The calculations account for losses due to the energy-conversion process and include the masses of both the fuel (or energy-storage device) and the energy-conversion components. Values used in the comparisons range from the current state of the art, or most-probable forecasts of characteristics, to highly optimistic projections of device characteristics. On the basis of this analysis, the range and acceleration for passenger vehicles utilizing the various propulsion systems are estimated. Power-boosted hybrid systems are also examined. DOE

N83-34333# United Technologies Corp., East Hartford, Conn.
OPTICAL DIAGNOSTICS FOR DIESEL-ENGINE APPLICATIONS
J. J. Sangiovanni, G. M. Dobbs, and P. A. Bonczyk Jan. 1983 72 p refs
(DE83-007201; DOE/AL-17575/T1) Avail: NTIS HC A04/MF A01

The applicability and limitations of coherent anti stokes raman spectroscopy (CARS) and a combination of laser light extinction and Mie scattering, respectively, to measurements of thermometry and species concentrations and of particulate size and concentration in sooty combustion environments typical of diesel combustion processes. The experimental methods used, and the difficulties in discriminating between soot particles and fuel droplets when using these methods are discussed. The viability of CARS as a diagnostic technique for diesel combustion is assessed. In the wick fed, diesel fueled flame there were regions of the flame in which gas breakdown could not be avoided. Under these conditions, the CARS signal was unobtainable using the high spatial resolution configuration. The atmospheric pressure flames used in these model experiments are only partially successful in emulating diesel combustion recommended is that in assessing the potential use of CARS for routine diesel applications, similar investigations be carried out under conditions which simulate diesel conditions more

closely and explore geometries which control the optical field intensities well enough to control breakdown. DOE

N83-34334# Electricite de France, Chatou. Dept. Optimisation et Automatisation des Processus.
BRIEF PRESENTATION OF A NUMERICAL MODEL OF A LIGHT WATER NUCLEAR REACTOR PRESSURIZER: DESCRIPTION AND VERIFICATION [PRESENTATION SUCCINCTE DU MODELE NUMERIQUE DE PESSURISEUR DE TRANCHE NUCLEAIRE A EAU LEGERE: DESCRIPTION ET VALIDATION]
P. Siarry Dec. 1981 28 p In FRENCH
(HP-40/81/347) Avail: NTIS HC A03/MF A01

A monitor-command model to reduce thermal stresses in the piping of pressurizers, particularly at angles, is presented. The modeling of the pressure and level regulation circuits is described. Coupling of the model to a model of the rest of the reactor, based on the LILLIPUT program, is outlined. Validation of the thermodynamic functions; determination of the liquid phase evaporation coefficient and of the vapor phase condensation coefficient; and validation of pressure and level control are outlined. Tests demonstrate the great importance of control parameters in model input. Author (ESA)

N83-34335# Electricite de France, Chatou. Dept. Optimisation et Automatisation des Processus.
SUMMARY OF SPEED CONTROL TESTS ON A TURBOGENERATOR [COMPTE RENDU DES ESSAIS DE LA REGULATION DE VITESSE GTA]
G. Laplaud Jan. 1982 75 p In FRENCH
(HP-40/82/348) Avail: NTIS HC A04/MF A01

An electrohydraulic speed regulator for a 900 MW turbogenerator underwent static and dynamic tests at up to full operating capacity. Tests on the pressure relays, valves, servocontrol cam and the speed/acceleration limiter are analyzed. The regulator performs to specification. Optimal settings are given. Author (ESA)

N83-34336# Laboratoire Suisse de Recherches Horlogeres, Neuchatel (Switzerland).
LUBRICATION OF FRETTING JOINTS Final Report
M. Maillat, H. E. Hintermann, H. Boving, H. R. Kocher, and G. Mondin Paris ESA 15 Jan. 1983 98 p refs In FRENCH; ENGLISH summary
(Contract ESTEC-4769/81/NL-AK)
(Rept-781.14.1; ESA-CR(P)-1761) Avail: NTIS HC A05/MF A01

The performance and optimum application domains of antifretting lubricants were assessed, using a specially designed test apparatus. Over 70 tests were carried out on 5, 11 and 18 mm samples, with steel, titanium and aluminum substrates. Results show that TiC is only efficient with steel and that hard Cr is abrasive, but doesn't become worn. Tiolube 1175 is very effective on steel and on titanium protected by Tiodize 2, and on anodized aluminum. Tiodize E20 on anodized aluminum is very effective. Tifran, Sulfinuz, WC, Tufran, Canadize, Magnagold, Nedox, Ematal, and Surfkote are not recommended. Author (ESA)

N83-34337# National Engineering Lab., East Kilbride (Scotland). Thermal Systems Div.
PERFORMANCE OF DYNAMICALLY LOADED JOURNAL BEARINGS. PART 1: EFFECT OF VARYING BEARING GEOMETRY AND OIL SUPPLY CONDITIONS
W. L. Cooke Mar. 1983 56 p refs
(NEL-683-Pt1; ISSN-0305-1439) Avail: NTIS HC A04/MF A01

The performance of hydrodynamic journal bearings, particularly those of internal combustion engines was assessed on an engine bearing simulator under a wide range of loadings. A system for measuring dynamic journal/bush displacement was developed. Data on the effects of bearing geometry and other parameters on oil flow and journal/bush displacement are presented. Author (ESA)

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N83-34338# Scientific Measurement Systems, Inc., Austin, Tex.
APPLICATION OF COMPUTERIZED TOMOGRAPHY FOR NONDESTRUCTIVE EVALUATION OF WELDMENTS Final Report, 1 Apr. - 30 Sep. 1982
Ira Lon Morgan and Sulaksh Gautam 18 Feb. 1983 86 p refs
(Contract F49620-82-C-0068)
(AD-A126812; AFOSR-83-0152TR) Avail: NTIS HC A05/MF A01 CSCL 14/5

The feasibility of applying the computerized tomographic (CT) processes to the nondestructive testing was investigated. Weldments were evaluated. The degree of spatial resolution obtained by tomographic techniques as a function of the tomographic parameters are examined. The applicability of CT processes to online quasi real time inspection of automated welding processes is determined. The potential feasibility of applying CT techniques to the general area of weldments, including online inspection of automated welding processed is indicated. E.A.K.

N83-34339# Southwest Research Inst., San Antonio, Tex.
NONDESTRUCTIVE TESTING INFORMATION ANALYSIS CENTER Annual Technical Report, 16 Feb. 1982 - 15 Feb. 1983
Richard T. Smith and Frances P. Hicks Watertown, Mass. Army Materials and Mechanics Research Center Mar. 1983 36 p
(Contract DLA900-79-C-1266)
(AD-A126785; SwRI-15-5607) Avail: NTIS HC A03/MF A01 CSCL 14/2

The major areas of activity are the information support system, current awareness and promotional activities, technical and bibliographic injuries, technical publications, and special services. The status of each of these areas is reviewed. GRA

N83-34340# Wisconsin Univ., Madison. Dept. of Statistics.
THE THEORY OF OPTIMAL CONFIDENCE LIMITS FOR SYSTEMS RELIABILITY WITH COUNTEREXAMPLES FOR RESULTS ON OPTIMAL CONFIDENCE LIMITS FOR SERIES SYSTEMS Scientific Interim Report
Bernard Harris and Andrew P. Soms Apr. 1983 21 p refs
(Contracts N00014-79-C-0321; DAAG29-80-C-0041)
(AD-A128218; TR-708) Avail: NTIS HC A02/MF A01 CSCL 12/1

The paper treats the general theory of optimal confidence limits for systems reliability introduced by Buehler. The general statements are specialized to the case of series systems. It is noted that many results previously given are false. In particular, counterexamples for results of Sudakov, Winterbottom and Harris and Soms are given. Numerical examples are provided, which suggest that despite the deficiencies of these results, they are nevertheless valid for those significance levels likely to be used in practice. GRA

N83-34341# Columbia Univ., New York.
ASYMPTOTIC THEORY FOR TWO ESTIMATORS OF THE GENERALIZED FAILURE RATE
B. L. S. PrakasaRao (Indian Statistical Inst.) and John VanRyzin 1982 19 p refs Presented at the Pacific Area Statistical Conf., Tokyo, 15 Dec. 1982
(Contract DE-AC02-76CH-00016)
(DE83-010014; BNL-32647; CONF-821230-1) Avail: NTIS HC A02/MF A01

The density estimation method of Van Ryzin (1973) is used to obtain two different estimators for the Generalized Failure Rate. The definition of the estimators and some preliminary results needed for later sections are given. The large sample properties for r/sub n/sup (1)(x) and r/sub n/sup (2) (x) are stated and proved. These include conditions under which the estimators are weakly and strongly consistent. Also, two central limit theorems

for each estimator with differing rates of convergence are also included. DOE

N83-34342# Bendix Corp., Kansas City, Mo.
COMPONENT RELIABILITY AS EXPERIENCED BY MANUFACTURE OF ELECTRONIC ASSEMBLIES
D. W. Clements Feb. 1983 8 p refs Presented at 33rd Electron. Components Conf., Orlando, Fla., 16 May 1983
(Contract DE-AC04-76DP-00613)
(DE83-011552; BDX-613-2872; CONF-830517-5) Avail: NTIS HC A02/MF A01

The component definition, procurement, and inspection procedures used by a manufacturer of very high reliability electronic products are reviewed. The performance of the components during the product manufacturing and inspection process is examined to determine the resultant component failure rate and failure modes. The failure rate for each component type and the most common failure mode for each component type are identified. This information then is reviewed to determine if there are any basic deficiencies not any component type and, if so, what recommendations or changes can be made to improve component reliability. DOE

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N83-34343 Brown Univ., Providence, R. I.
PROPAGATING ELASTIC-PLASTIC FIELDS: ASYMPTOTIC ANALYSIS OF PLANE STRAIN CRACK GROWTH AND RESTRICTIONS ON MOVING SURFACES OF STRONG DISCONTINUITY Ph.D. Thesis
Walter John Drugan 1982 137 p
Avail: Univ. Microfilms Order No. DA8228246

Elucidation of the stress and deformation fields near the tip of a quasistatically advancing plane strain tensile crack in an elastic-ideally plastic solid is investigated. An exact asymptotic analysis of this problem to lowest order in r, where r is distance from the crack tip is presented. The crack tip field derived is comprised of five angular sectors on each side of the crack symmetry line, which include all four of the different asymptotically - possible sector types. As this crack tip field passes over a material point, that point experiences: plastic straining weaker than/n r as the front 'constant stress' sector passes; a jump in plastic shear strain (as r approaches the limit of 0) varies as /n r at the front boundary of the 'centered fan' sector (slip-line terminology applies for these sectors as r approaches the limit of 0); continued plastic strain accumulation varies as /n r until the next sector arrives, the passage of which contributes bounded plastic strain for r approaches the limit of 0; elastic unloading as the fourth sector passes; reversed plastic yielding due to the sector adjacent to the crack flank. Dissert. Abstr.

N83-34344 California Univ., Berkeley.
COMPUTATIONAL MODALS FOR CYCLIC PLASTICITY, RATE DEPENDENCE, AND CREEP IN FINITE ELEMENTS ANALYSIS Ph.D. Thesis
Bahram Mosaddad 1982 157 p
Avail: Univ. Microfilms Order No. DA8300596

In recent years, much research has been directed towards the development of numerical procedures and computer programs for analysis of the inelastic response of structures. However, the capabilities of most programs for modeling inelastic material behavior are limited to rate-independent plasticity based on classical isotropic and kinematic hardening theories. The major objective of this study has been to develop improved analytical capabilities for metal structures subjected to general loading conditions, expecially cyclic and impact loading. Towards this goal an attempt has been made to develop a reliable and efficient computational model for metal plasticity that is applicable to a wide range of stress analysis problems, including plane stress, plane strain, axisymmetric and three dimensional solids. A secondary objective has been the development of an improved solution strategy for analysis of the creep response of metal structures. Following examination of several available material models, the Mroz plasticity model was adopted as being the most promising for further developments. Dissert. Abstr.

N83-34345 Brown Univ., Providence, R. I.
DYNAMIC FRACTURE TOUGHNESS OF DUCTILE MATERIALS IN ANTIPLANE SHEAR Ph.D. Thesis
Andrew Sholto Douglas 1982 81 p
Avail: Univ. Microfilms Order No. DA8228245

A numerical study of the dynamic steady-state antiplane shear (mode 3) fracture process is described. The study is based on continuum mechanics, and the material is modeled as being either elastic-plastic or elastic-viscoplastic. Using the small scale yielding hypothesis of fracture mechanics and allowing only for steady state crack growth, but including the effects of material inertia explicitly, a full field solution for the deformations is obtained by means of an iteration procedure involving the finite element method. Pertinent results of the calculation, such as the shape of the active crack tip plastic zone and the strain distribution ahead of the crack are presented. Calculated strain distributions are compared with known exact strain singularities. The fracture criterion for materials which fail in a locally ductile manner proposed by McClintock and Irwin (1965), which stipulates that crack growth will proceed such that a critical strain level is maintained at a characteristic distance ahead of the crack tip, is adopted. Dissert. Abstr.

N83-34346 Purdue Univ., Lafayette, Ind.
LINEAR DYNAMIC ANALYSIS OF REVOLUTIONARY SHELLS USING FINITE ELEMENTS AND MODAL EXPANSION Ph.D. Thesis
Yuan-Bin Chang 1982 111 p
Avail: Univ. Microfilms Order No. DA8300893

Doubly-curved, axisymmetric shell finite elements are used to perform the dynamic analysis of shells of revolution. The modal expansion method is used since it is more efficient than the direct integration method when the axisymmetric shell structures are subjected to certain specific loadings. For the case of complicated loadings such as travelling loads, the modal participation factors are obtained in the form of convolution integrals which can be solved either by Laplace transformation or by numerical integration. Orthogonality conditions between displacement functions and the Fourier expansions of loadings have been used to simplify the consistent loads. It thus becomes possible to perform response calculations, like impulse response, step response, frequency response, travelling loading response, and also static deflections. The effectiveness of the present method is demonstrated through its performance in a series of examples with results compared to alternative solutions with excellent agreements. Dissert. Abstr.

N83-34347 Ohio State Univ., Columbus.
FINITE ELEMENT EIGENFUNCTION METHOD (FEEM) FOR ELASTIC WAVE SCATTERING PROBLEMS Ph.D. Thesis
Jen-Houne Hannsen Su 1982 118 p
Avail: Univ. Microfilms Order No. DA8300359

This dissertation presents a newly developed method (FEEM) capable of investigating the scattering of elastic waves by inhomogeneities with intricate geometries. Both two- and three dimensional problems are treated. In the 2-D case, a plane harmonic wave incident normal to a very long cylindrical inhomogeneity which is uniform along its axis in an infinite homogeneous elastic medium is considered. In 3-D problems, the analysis corresponds to the scattering features of a general elastic wave of arbitrary incident angle impinging on a local inhomogeneity with an axis of symmetry in the infinite medium. These two cases have been analyzed by enclosing the local inhomogeneity within an imaginary circular cylinder and sphere, respectively. Compari-

sons have been made with the exact analysis for circular cylindrical and spherical cavities and good agreement is achieved. Comparisons have also been made with the T-matrix calculations corresponding to some non-circular and non-spherical cavities and inclusions for arbitrary angle of incidence and again good agreement is shown. Dissert. Abstr.

N83-34348*# Clemson Univ., S.C. Dept. of Mechanical Engineering.

AN INVESTIGATION OF THE ACCURACY OF FINITE DIFFERENCE METHODS IN THE SOLUTION OF LINEAR ELASTICITY PROBLEMS Final Report

Nelson R. Bauld, Jr. and James G. Goree 15 Aug. 1983 78 p refs

(Grant NAG1-316)

(NASA-CR-173015; NAS 1.26:173015) Avail: NTIS HC A05/MF A01 CSCL 20K

The accuracy of the finite difference method in the solution of linear elasticity problems that involve either a stress discontinuity or a stress singularity is considered. Solutions to three elasticity problems are discussed in detail: a semi-infinite plane subjected to a uniform load over a portion of its boundary; a bimetallic plate under uniform tensile stress; and a long, midplane symmetric, fiber reinforced laminate subjected to uniform axial strain. Finite difference solutions to the three problems are compared with finite element solutions to corresponding problems. For the first problem a comparison with the exact solution is also made. The finite difference formulations for the three problems are based on second order finite difference formulas that provide for variable spacings in two perpendicular directions. Forward and backward difference formulas are used near boundaries where their use eliminates the need for fictitious grid points. S.L.

N83-34349*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

RELATION OF CYCLIC LOADING PATTERN TO MICROSTRUCTURAL FRACTURE IN CREEP FATIGUE

S. S. Manson (Case Western Reserve Univ.), G. R. Halford, and R. E. Oldrieve 1983 44 p refs Proposed for presentation at Fatigue 84 The 2nd Intern. Conf. on Fatigue and Fatigue Thresholds, Birmingham, England, 3-7 Sep. 1984

(NASA-TM-83473; E-1787; NAS 1.15:83473) Avail: NTIS HC A03/MF A01 CSCL 20K

Creep-fatigue-environment interaction is discussed using the 'strainrange partitioning' (SRP) framework as a basis. The four generic SRP strainrange types are studied with a view of revealing differences in micromechanisms of deformation and fatigue degradation. Each combines in a different manner the degradation associated with slip-plane sliding, grain-boundary sliding, migration, cavitation, void development and environmental interaction; hence the approch is useful in delineating the relative importance of these mechanisms in the different loadings. Micromechanistic results are shown for a number of materials, including 316 SS, wrought heat resistant alloys, several nickel-base superalloys, and a tantalum base alloy, T-111. Although there is a commonality of basic behavior, the differences are useful in delineation several important principles of interpretation. Some quantitative results are presented for 316 SS, involving crack initiation and early crack growth, as well as the interaction of low-cycle fatigue with high-cycle fatigue. M.G.

N83-34350*# College of William and Mary, Newport News, Va.

THE EFFECT OF ATMOSPHERIC DRAG ON THE DESIGN OF SOLAR-CELL POWER SYSTEMS FOR LOW EARTH ORBIT

Albert C. Kyser Jun. 1983 77 p refs

(Contract NAS1-16042)

(NASA-CR-166020; NAS 1.26:166020) Avail: NTIS HC A05/MF A01 CSCL 20K

The feasibility of reducing the atmospheric drag of low orbit solar powered satellites by operating the solar-cell array in a minimum-drag attitude, rather than in the conventional Sun pointing attitude was determined. The weights of the solar array, the energy storage batteries, and the fuel required to overcome the drag of the solar array for a range of design life times in orbit were considered. The drag of the array was estimated by free molecule flow theory, and the system weights were calculated from unit weight estimates for 1990 technology. The trailing, minimum drag system was found to require 80% more solar array area, and 30% more battery capacity, the system weights for reasonable life times were dominated by the thruster fuel requirements. E.A.K.

N83-34351*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NONLINEAR CONSTITUTIVE RELATIONS FOR HIGH TEMPERATURE APPLICATIONS

Mar. 1983 360 p refs Symp. held in Akron, Ohio, 19-20 May 1982; sponsored by Akron Univ.

(NASA-CP-2271; E-1541; NAS 1.55:2271) Avail: NTIS HC A16/MF A01 CSCL 20K

The topics of discussion addressed were material behavior, design analysis, deformation kinetics, metallurgical characterization, mechanical subelement models, stress analysis, fracture mechanics, viscoplasticity, and thermal loading. For individual titles, see N83-34352 through N83-34371.

N83-34352*# Oak Ridge National Lab., Tenn.

CORRELATION OF RUPTURE LIFE, CREEP RATE, AND MICROSTRUCTURE FOR TYPE 304 STAINLESS STEEL

R. W. Swindeman and J. Moteff (Cincinnati Univ.) *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 1-12 refs Sponsored by DOE (For primary document see N83-34351 22-39)

Avail: NTIS HC A16/MF A01 CSCL 20K

The stress and temperature sensitivites of the rupture life and secondary creep rate were examined in detail for a single heat of type 304 stainless steel (9T2796). Assuming that the rupture life has a power law stress dependency, relatively small differences in the stress exponent were observed over a broad range of stress and temperature. In contrast, large changes were observed for equivalent parameter for secondary creep rate. As a result of these differences, the Monkman-Grant correlation was sensitive to stress and temperature below 650 C. Metallurgical studies based on light and transmission electron microscopy suggested that the temperature and stress sensitivities of secondary creep rate at temperatures below 650 C were related to features of the substructure not present at higher temperature. Specifically, the presence of a fine dislocation network stabilized by precipitates altered the stress and temperature sensitivities relative to what might be expected from high temperature studies. Author

N83-34353*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

TENSILE AND COMPRESSIVE CONSTITUTIVE RESPONSE OF 316 STAINLESS STEEL AT ELEVATED TEMPERATURES

S. S. Manson, U. Muralidharan, and G. R. Halford *In its* Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 13-42 refs Prepared in cooperation with Case Western Reserve Univ. (For primary document see N83-34351 22-39)

(Grant NAG3-46)

Avail: NTIS HC A16/MF A01 CSCL 20K

Creep rate in compression is lower by factors of 2 to 10 than in tension if the microstructure of the two specimens is the same and are tested at equal temperatures and equal but opposite stresses. Such behavior is characteristic for monotonic creep and conditions involving cyclic creep. In the latter case creep rate in both tension and compression progressively increases from cycle to cycle, rendering questionable the possibility of expressing a time stabilized constitutive relationship. The difference in creep rates in tension and compression is considerably reduced if the tension specimen is first subjected to cycles of tensile creep (reversed by compressive plasticity), while the compression specimen is first subjected to cycles of compressive creep (reversed by tensile plasticity). In both cases, the test temperature is the same and the stresses are equal and opposite. Such reduction is a reflection of differences in microstructure of the specimens resulting from different prior mechanical history. Author

N83-34354*# Pratt and Whitney Aircraft Group, East Hartford, Conn.
EVALUATION OF THREE CONSTITUTIVE MODELS FOR THE PREDICTION OF HASTELLOY X ELEVATED TEMPERATURE CYCLIC RESPONSE
Vito Moreno *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 43-46 refs (For primary document see N83-34351 22-39)
Avail: NTIS HC A16/MF A01 CSCL 20K

The approach for the method development assumes that, for a thermally loaded structure, the overall strain history is defined by linear elastic analysis. The local stress history at a fatigue critical location is then determined from a one dimensional material behavior model and the local strain and temperature conditions. Three material models are currently being evaluated to assess their ability to predict relevant high temperature cyclic material response characteristics. They are: a time independent classical plasticity and creep representation, a time dependent viscoplastic model capable of predicting combined creep and plasticity effects, and an approximate elastic analysis approach that uses a series of stress-strain curves and a cyclic hardening model to determine reverse plasticity. Author

N83-34355*# Michigan State Univ., East Lansing.
EXPERIMENTAL VERIFICATION OF THE NUMBER RELATION AT ROOM AND ELEVATED TEMPERATURES
Lonnie J. Lucas and John F. Martin *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 47-68 refs (For primary document see N83-34351 22-39)
(Grant NAG3-51)
Avail: NTIS HC A16/MF A01 CSCL 20K

The accuracy of the Neuber equation for predicting notch root stress-strain behavior at room temperature and at 650 C was experimentally investigated. Strains on notched specimens were measured with a non-contacting, interferometric technique and stresses were simulated with smooth specimens. Predictions of notch root stress-strain response were made from the Neuber Equation and smooth specimen behavior. Neuber predictions gave very accurate results at room temperature. However, the predicted interaction of creep and stress relaxation differed from experimentally measured behavior at 650 C. Author

N83-34356*# General Electric Co., Cincinnati, Ohio.
MULTIAXIAL CYCLIC THERMOPLASTICITY ANALYSIS WITH BESSELING'S SUBVOLUME METHOD
R. L. McKnight *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 69-88 refs (For primary document see N83-34351 22-39)
Avail: NTIS HC A16/MF A01

A modification was formulated to Besseling's Subvolume Method to allow it to use multilinear stress-strain curves which are temperature dependent to perform cyclic thermoplasticity analyses. This method automotically reproduces certain aspects of real material behavior important in the analysis of Aircraft Gas Turbine Engine (AGTE) components. These include the Bauschinger effect, cross-hardening, and memory. This constitutive equation was implemented in a finite element computer program called CYANIDE. Subsequently, classical time dependent plasticity (creep) was added to the program. Since its inception, this program was assessed against laboratory and component testing and engine experience. The ability of this program to simulate AGTE material response characteristics was verified by this experience and its utility in providing data for life analyses was demonstrated. In this area of life analysis, the multiaxial thermoplasticity capabilities of the method have proved a match for the actual AGTE life experience. Author

N83-34357*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EVALUATION OF INELASTIC CONSTITUTIVE MODELS FOR NONLINEAR STRUCTURAL ANALYSIS
Albert Kaufman *In its* Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 89-106 refs (For primary document see N83-34351 22-39)
Avail: NTIS HC A16/MF A01 CSCL 20K

The influence of inelastic material models on computed stress-strain states, and therefore predicted lives, was studied for thermomechanically loaded structures. Nonlinear structural analyses were performed on a fatigue specimen which was subjected to thermal cycling in fluidized beds and on a mechanically load cycled benchmark notch specimen. Four incremental plasticity creep models (isotropic, kinematic, combined isotropic-kinematic, combined plus transient creep) were exercised. Of the plasticity models, kinematic hardening gave results most consistent with experimental observations. Life predictions using the computed strain histories at the critical location with a Strainrange Partitioning approach considerably overpredicted the crack initiation life of the thermal fatigue specimen. Author

N83-34358*# Oak Ridge National Lab., Tenn.
CONSTITUTIVE EQUATIONS FOR USE IN DESIGN ANALYSES OF LONG-LIFE ELEVATED TEMPERATURE COMPONENTS
Claud E. Pugh and David N. Robinson *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 107-112 refs (For primary document see N83-34351 22-39)
(Contract W-7405-eng-26)
Avail: NTIS HC A16/MF A01 CSCL 20K

Design analysis needs and procedures relative to elevated temperature components in liquid metal fast breeder reactor (LMFBR) system were examined. The effects of the thermal transients on the pressure boundary components are enhanced by the excellent heat transfer properties of the liquid sodium coolant. Design criteria for high temperature nuclear reactor components recognize the potential occurrence of inelastic structural response. Specifically, criteria and limits were developed which reflect a recognition of this potential and employ design by analysis concepts that requires that inelastic (elastic-plastic and creep) analyses be performed. Constitutive equations to represent multiaxial time-dependent responses of LMFBR alloys are established. The development of equations applicable under cyclic loading conditions are outlined. E.A.K.

N83-34359*# Northwestern Univ., Evanston, Ill.
MICROMECHANICALLY BASED CONSTITUTIVE RELATIONS FOR POLYCRYSTALLINE SOLIDS
S. Nemat-Nasser and T. Iwakuma *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 113-136 refs (For primary document see N83-34351 22-39)
(Grant NAG3-134)
Avail: NTIS HC A16/MF A01 CSCL 20K

A basic method to estimate the overall mechanical response of solids which contain periodically distributed defects is presented. The method estimates the shape and growth pattern of voids periodically distributed over the grain boundaries in a viscous matrix. The relaxed moduli are obtained for a polycrytalline solid that undergoes relaxation by grain boundary sliding which accounts for the interaction effects. The overall inelastic nonlinear response at elevated temperatures in terms of a model which considers nonlinear power law creep within the grains, and linear viscous flow in the grain boundaries is discussed. E.A.K.

N83-34360*# Cincinnati Univ., Ohio.
ON THE APPLICATION OF DEFORMATION KINETICS TO NONLINEAR CONSTITUTIVE RELATIONS AT HIGHER TEMPERATURES
K. C. Valanis and C. F. Lee *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 139-152 refs (For primary document see N83-34351 22-39)
Avail: NTIS HC A16/MF A01 CSCL 20K

A single phenomenological constitutive equation is derived theoretically from first principles and applied to aluminum, tin and lead. The theory is based on deformation kinetics of steady creep in which the fundmental mechanism is atomic transport over potential barriers whose conformation is distorted by the application

of a stress field. The form of the functional dependence of barrier distortion and stress over the entire temperature range is found to be a sigmoidal curve which tends to straight lines of a unit slope in the small and high stress regions. With this form of barrier distortion, the constitutive equation prediction the steady creep behavior of aluminum, tin and lead over a wide range of temperature and stress. E.A.K.

N83-34361*# Cincinnati Univ., Ohio.
A POTENTIAL FUNCTION DERIVATION OF A CONSTITUTIVE EQUATION FOR INELASTIC MATERIAL RESPONSE
Donald C. Stouffer and Nader Abu ElFoutouh *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 153-178 refs (For primary document see N83-34351 22-39)
(Contract F33615-78-C-5199)
Avail: NTIS HC A16/MF A01 CSCL 20K

Physical and thermodynamic concepts are used to develop a potential function for application to high temperature polycrystalline material response. Inherent in the formulation is a differential relationship between the potential function and constitutive equation in terms of the state variables. Integration of the differential relationship produces a state variable evolution equation that requires specification of the initial value of the state variable and its time derivative. It is shown that the initial loading rate, which is directly related to the initial hardening rate, can significantly influence subsequent material response. This effect is consistent with observed material behavior on the macroscopic and micoscopic levels, and may explain the wide scatter in response often found in creep testing. E.A.K.

N83-34362*# Oak Ridge National Lab., Tenn.
A UNIFIED CONSTITUTIVE RELATIONSHIP FOR THE TIME-DEPENDENT BEHAVIOR OF FAST BREEDER ALLOYS
D. N. Robinson *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 179-184 refs (For primary document see N83-34351 22-39)
(Contract W-7405-eng-26)
Avail: NTIS HC A16/MF A01 CSCL 20K

Constitutive equations based on classical concepts of creep and plasticity generally rest on the assumption that the inelastic strain can be decomposed into two distinct and additive contributions, one time dependent (creep) and the other time dependent (plastic). It is suggested that an approach is to adopt a unified representation in which creep and plasticity are characterized as occurring simultaneously and interactively and time is an essential ingredient throughout. Examples of the inherent time dependency exhibited by some fast breeder alloys at elevated temperature are rate dependency under monotonic and cyclic straining, thermal recovery and strong creep-elasticity interaction. The stron influence of the recent history of plastic straining on stress relaxation is shown. E.A.K.

N83-34363*# Texas A&M Univ., College Station.
APPLICATION OF AN UNCOUPLED ELASTIC-PLASTIC-CREEP CONSTITUTIVE MODEL TO METALS AT HIGH TEMPERATURE
Walter E. Haisler *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 185-190 (For primary document see N83-34351 22-39)
Avail: NTIS HC A16/MF A01 CSCL 20K

A uniaxial, uncoupled constitutive model to predict the response of thermal and rate dependent elastic-plastic material behavior is presented. The model is based on an incremental classicial plasticity theory extended to account for thermal, creep, and transient temperature conditions. Revisions to he combined hardening rule of the theory allow for better representation of cyclic phenomenon including the high rate of strain hardening upon cyclic reyield and cyclic saturation. An alternative approach is taken to model the rate dependent inelastic deformation which utilizes hysteresis loops and stress relaxation test data at various temperatures. The model is evaluated and compared to experiments which involve various thermal and mechanical load histories on 5086 aluminum alloy, 304 stainless steel and Hastelloy-X. E.A.K.

N83-34364*# Cincinnati Univ., Ohio.
SOME RECENT DEVELOPMENTS IN THE ENDOCHRONIC THEORY WITH APPLICATION TO CYCLIC HISTORIES
K. C. Valanis and C. F. Lee *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 191-216 refs (For primary document see N83-34351 22-39)
Avail: NTIS HC A16/MF A01 CSCL 20K

Constitutive equations with only two easily determined material constants predict the stress (strain) response of normalized mild steel to a variety of general strain (stress) histories, without a need for special unloading-reloading rules. The equations are derived from the endochronic theory of plasticity of isotropic materials with an intrinsic time scale defined in the plastic strain space. Agreement between theoretical predictions and experiments are are excellent quantitatively in cases of various uniaxial constant amplitude histories, variable uniaxial strain amplitude histories and cyclic relaxation. The cyclic ratcheting phenomenon is predicted by the present theory. E.A.K.

N83-34365*# Texas A&M Univ., College Station.
A NEW UNCOUPLED VISCOPLASTIC CONSTITUTIVE MODEL
Walter L. Bradley and Shik Yuen *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 217-234 (For primary document see N83-34351 22-39)
Avail: NTIS HC A16/MF A01 CSCL 20K

A new uncoupled viscoplastic model has been proposed along with experiments and analysis to define the various material constraints. Distinguishing between rate sensitive and rate insensitive strain allows the rate sensitive strain to be modelled over a wide range of temperatures with very little variation in the stress component 'n'. Furthermore, it allows the rounded corners on stress-strain hysteresis loops to be achieved very naturally. Author

N83-34366*# Cincinnati Univ., Ohio.
CORRELATIONS BETWEEN METALLURGICAL CHARACTERIZATION STUDIES, EXPLORATORY MECHANICAL TESTS, AND CONTINUUM MECHANICS APPROACHES TO CONSTITUTIVE EQUATIONS
J. Moteff, C. E. Pugh, and R. W. Swindeman *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 235-238 Prepared in cooperation with ORNL (For primary document see N83-34351 22-39)
(Contract W-7405-eng-26)
Avail: NTIS HC A16/MF A01 CSCL 20K

Austenitic stainless steels, such as types 316 and 304, are widely used as pressure vessel materials in the temperature range of 425 to 650 C. Stainless steel specimens were tested to rupture at two different stress levels sigma and sigma 2 sigma 1 >sigma 2) to establish the normal stain-time behavior. A subsequent test was performed in which the specimen was crept at the higher stress (sigma 1) to the beginning of the secondary stage of creep, presumed to be the strain/time conditions at which a steady state microstructure is developed, and then the stress was reduced to the lower level (sigma 2). The associated microstructure, and significance of this microstructure on the creep strain-hardening model for variable uniaxial loads were assesed and found to be consistent with the use of creep-recovery models at high stresses and temperatures and strain-hardening models at low stresses and temperatures. Author

N83-34367*# United Technologies Research Center, East Hartford, Conn.
A NONVOLUME PRESERVING PLASTICITY THEORY WITH APPLICATIONS TO POWDER METALLURGY
Brice N. Cassenti *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 239-266 refs (For primary document see N83-34351 22-39)
(Contract F49620-78-C-0090)
Avail: NTIS HC A16/MF A01 CSCL 20K

A plasticity theory has been developed to predict the mechani-

cal response of powder metals during hot isostatic pressing. The theory parameters were obtained through an experimental program consisting of hydrostatic pressure tests, uniaxial compression and uniaxial tension tests. A nonlinear finite element code was modified to include the theory and the results of themodified code cmpred favorably to the results from a verification experiment. Author

N83-34368*# Dayton Univ., Ohio.
CONSTITUTIVE MODELS BASED ON COMPRESSIBLE PLASTIC FLOWS
A. M. Rajendran *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 267-282 refs (For primary document see N83-34351 22-39)
Avail: NTIS HC A16/MF A01 CSCL 20K

The need for describing mterials under time or cycle dependent loading donditions has been emphasized in recent years by several investigators. In response to the need, various constitutive models describing the nonlinear behavior of materials under creep, fatigue, or other complex loading conditions were developed. The developed models for describing the fully dense (non-porous) materials were mostly based on uncupled plasticity theory. The improved characterization of materials provides a better understanding of the structual response under complex loading conditions. The pesent studies demonstrate that the rate or time dependency of the response of a porous aggregate can be incorporated into the nonlinear constitutive behavior of a porous solid by appropriately modeling the incompressible matrix behavior. It is also sown that the yield function which wads determined by a continuum mechanics approach must be verified by appropriate experiments on void containing sintered materials in order to obtain meaningful numbers for the constants that appear in the yield function. B.W.

N83-34369*# Massachusetts Inst. of Tech., Cambridge.
TIME-INDEPENDENT ANISOTROPIC PLASTIC BEHAVIOR BY MECHANICAL SUBELEMENT MODELS
Theodore H. H. Pian *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 283-300 refs (For primary document see N83-34351 22-39)
(Grant NAG3-33)
Avail: NTIS HC A16/MF A01 CSCL 20K

The paper describes a procedure for modelling the anisotropic elastic-plastic behavior of metals in plane stress state by the mechanical sub-layer model. In this model the stress-strain curves along the longitudinal and transverse directions are represented by short smooth segments which are considered as piecewise linear for simplicity. The model is incorporated in a finite element analysis program which is based on the assumed stress hybrid element and the iscoplasticity-theory. Author

N83-34370*# Akron Univ., Ohio.
CONSTRAINED SELF-ADAPTIVE SOLUTIONS PROCEDURES FOR STRUCTURE SUBJECT TO HIGH TEMPERATURE ELASTIC-PLASTIC CREEP EFFECTS
Joseph Padovan and Surapong Tovichakchaikul *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 301-304 refs (For primary document see N83-34351 22-39)
(Grant NAG3-54)
Avail: NTIS HC A16/MF A01 CSCL 20K

This paper will develop a new solution strategy which can handle elastic-plastic-creep problems in an inherently stable manner. This is achieved by introducing a new constrained time stepping algorithm which will enable the solution of creep initiated pre/postbuckling behavior where indefinite tangent stiffnesses are encountered. Due to the generality of the scheme, both monotone and cyclic loading histories can be handled. The presentation will give a thorough overview of current solution schemes and their short comings, the development of constrained time stepping algorithms as well as illustrate the results of several numerical experiments which benchmark the new procedure. B.W.

N83-34371*# Georgia Inst. of Tech., Atlanta.
STRESS AND FRACTURE ANALYSES UNDER ELASTIC-PLASTIC CREEP CONDITIONS: SOME BASIC DEVELOPMENTS AND COMPUTATIONAL APPROACHES
K. W. Reed, R. B. Stonesifer, and S. N. Atluri *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl. Mar. 1983 p 305-366 refs (For primary document see N83-34351 22-39)
(Grant NAG3-38)
Avail: NTIS HC A16/MF A01 CSCL 20K

A new hybrid-stress finite element algorith, suitable for analyses of large quasi-static deformations of inelastic solids, is presented. Principal variables in the formulation are the nominal stress-rate and spin. A such, a consistent reformulation of the constitutive equation is necessary, and is discussed. The finite element equations give rise to an initial value problem. Time integration has been accomplished by Euler and Runge-Kutta schemes and the superior accuracy of the higher order schemes is noted. In the course of integration of stress in time, it has been demonstrated that classical schemes such as Euler's and Runge-Kutta may lead to strong frame-dependence. As a remedy, modified integration schemes are proposed and the potential of the new schemes for suppressing frame dependence of numerically integrated stress is demonstrated. The topic of the development of valid creep fracture criteria is also addressed. B.W.

N83-34372*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SIMPLIFIED METHOD FOR NONLINEAR STRUCTURAL ANALYSIS
Albert Kaufman Sep. 1983 15 p refs
(NASA-TP-2208; E-1646; NAS 1.60:2208) Avail: NTIS HC A02/MF A01 CSCL 20K

A simplified inelastic analysis computer program was developed for predicting the stress-strain history of a thermomechanically cycled structure from an elastic solution. The program uses an iterative and incremental procedure to estimate the plastic strains from the material stress-strain properties and a simulated plasticity hardening model. The simplified method was exercised on a number of problems involving uniaxial and multiaxial loading, isothermal and nonisothermal conditions, and different materials and plasticity models. Good agreement was found between these analytical results and nonlinear finite element solutions for these problems. The simplified analysis program used less than 1 percent of the CPU time required for a nonlinear finite element analysis. Author

N83-34373*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A SOLUTION PROCEDURE FOR BEHAVIOR OF THICK PLATES ON A NONLINEAR FOUNDATION AND POSTBUCKLING BEHAVIOR OF LONG PLATES
Manuel Stein and Peter A. Stein Sep. 1978 40 p refs
(Contract NCC1-15)
(NASA-TP-2174; L-15587; NAS 1.60:2174) Avail: NTIS HC A03/MF A01 CSCL 20K

Approximate solutions for three nonlinear orthotropic plate problems are presented: (1) a thick plate attached to a pad having nonlinear material properties which, in turn, is attached to a substructure which is then deformed; (2) a long plate loaded in inplane longitudinal compression beyond its buckling load; and (3) a long plate loaded in inplane shear beyond its buckling load. For all three problems, the two dimensional plate equations are reduced to one dimensional equations in the y-direction by using a one dimensional trigonometric approximation in the x-direction. Each problem uses different trigonometric terms. Solutions are obtained using an existing algorithm for simultaneous, first order, nonlinear, ordinary differential equations subject to two point boundary conditions. Ordinary differential equations are derived to determine the variable coefficients of the trigonometric terms. E.A.K.

N83-34374# National Aerospace Lab., Amsterdam (Netherlands).
THE APPLICATION OF FRACTURE MECHANICS TO THE GROWTH OF CREEP CRACKS
H. P. vanLeeuwen Jun. 1983 58 p refs

(AGARD-R-705; ISBN-92-835-1453-X) Avail: NTIS HC A04/MF A01

The application of fracture mechanics to the growth of creep cracks is discussed. It is shown that linear elastic fracture mechanics were successfully applied to the residual strength of brittle materials, crack growth due to stress corrosion and crack growth due to fatigue. The methods are discussed to account for plasticity. A survey is made of the attempts to correlate the crack growth rate under creep conditions with the stress intensity factor, the net section stress, the reference stress, the crack opening displacement rate, the contour integral J and the contour integral J*. Alternative methods to calculate J and J* are considered. A survey is also made of theoretical predictions of crack growth rate as a function of parameters that are considered to be determined. S.L.

N83-34375# Texas Univ., Austin. Dept. of Civil Engineering.
BEHAVIOR OF A HIGH-STRENGTH CONCRETE MODEL SUBJECTED TO BIAXIAL COMPRESSION Annual Report, 15 Jun. 1981 - 31 Dec. 1982
Jon C. Herrin, Ramon L. Carrasquillo, and David W. Fowler Dec. 1982 148 p refs
(Grant AF-AFOSR-0202-81)
(AD-A126442; AFOSR-83-9137TR) Avail: NTIS HC A07/MF A01 CSCL 11/2

The stress-strain behavior, ultimate strength, and failure mechanism of high-strength concrete subjected to biaxial compression is determined. Model concrete plate specimens, composed of nine agregate discs embedded in a mortar matrix, were used. Three different coarse aggregates togethr with three different mortar mixes having different strength and elastic properties were used in order to determine the effects of material properties on the behavior of high-strength concrete subjected to biaxial compression. The plate specimens were tested using four biaxial stress ratios: 0 (uniaxial), 0.2, 0.5, and 1.0. Deformations in both the major and minor principal directions were measured using direct current differential transducers. Stress-strain characteristics, discontinuity, ultimate strength and failure modes in biaxial compression as a function of materials properties are discussed. GRA

N83-34376# Washington Univ., Seattle. Dept. of Mechanical Engineering.
FURTHER STUDIES ON DYNAMIC CRACK BRANCHING
M. Ramulu, A. S. Kobayashi, B. S.-J. Kang, and D. B. Barker Mar. 1983 28 p refs
(Contract N00014-76-C-0060; NR Proj. 064-478)
(AD-A126444; UWA/DME/TR-82/46) Avail: NTIS HC A03/MF A01 CSCL 20/1

The newly derived dynamic crack branching criterion is verified by dynamic photoelastic analysis of dynamic crack branchings in thin polycarbonate, single edged crack tension specimens. Successful crack branching was observed in four specimens and unsuccessful branchings in another. Crack branching consistently occurred when the necessary condition of K sub IB = 3.3 MPa square root of m and the sufficient condition of r sub 0 = sub 0 = 0.7 mm were satisfied simultaneously. In the unsuccessful branching test the necessary condition was not satisfied since K sub J was always less than K sub IB. Author

N83-34377# Edo Western Corp., Salt Lake City, Utah. Fiber Science Div.
BRIDGE WOUND WEB MODULE Final Report
1983 125 p
(AD-A128010) Avail: NTIS HC A06/MF A01 CSCL 13/13

The filament wound process for the manufacture of a bridge web was demonstrated to be both feasible and practical. This program identified some process modifications that are required for low cost production. The modified process will retain the attractive features of the wound W process, but will greatly reduce tooling costs and improve producibility resulting in lower labor costs. The winding angle may be modified from 45 degrees 45 to 50 degrees to improve the winding pattern without impacting the structural integrity, but should be left at 45 degrees for maximum strength at minimum thickness. The design requirements for edge filler are met by the syntactic foam which Fiber Science used. This foam reduced the weight by an average of eight pounds per web over the weight of solid epoxy resin edge filler. Tests of the syntactic foam compressive strength, although high enough to meet design requirements, were not as high as anticipated. GRA

N83-34378# National Research Council of Canada, Ottawa (Ontario).
THE EFFECTIVE LENGTH OF A CRACK TERMINATED BY A HOLE
G. R. Cowper Jan. 1983 16 p
(AD-A128197; NAE-AN-2; NRC-20958) Avail: NTIS HC A02/MF A01 CSCL 20/11

The influence of a small hole at the tip of a crack on the compliance of a cracked specimen is examined. It is shown that the compliance of the specimen with a hole is the same as the compliance of a specimen with an infinitely sharp but slightly longer crack, the increment of length being proportional to the radius of the hole. In the case of mode III straining (the tearing mode) the equivalent sharp crack extends beyond the edge of the hole a distance equal to the radius of the hole. The results are pertinent to the experimental measurement of stress intensity factors. Author (GRA)

N83-34379# Defence Research Establishment Pacific, Victoria (British Columbia).
CRACK INITIATION AND PROPAGATION PROPERTIES OF HY 130 STEEL WELDMENTS FOLLOWING TEMPER EMBRITTLEMENT
K. I. McRae Sep. 1982 21 p refs
(AD-A130284; DREP-82-M) Avail: NTIS HC A02/MF A01 CSCL 11/6

Elastic-plastic fracture mechanics (EPFM) may be applied to engineering problems to determine material properties related to crack initiation and propagation. Specifically, these concepts have been applied to a study of the as welded and temper embrittled weldments of HY 130 steel. The property relating the energy requirement for ductile crack initiation, Jlc or Klc, is seen to be similar in both instances, although previous Charpy V-notch testing results have indicated large differences in toughness. The sensitivity to embrittlement is reflected, however, by a large difference in the crack propagation property, the tearing modules, T. The data are also compared to crack initiation and crack propagation energies measured during instrumented impact tests. Author (GRA)

N83-34380# Argonne National Lab., Ill. Engineering Mechanics Program.
FINITE-ELEMENT BLUNT-CRACK PROPAGATION. A MODIFIED J-INTEGRAL APPROACH
Y. C. Pan, A. N. Marchertas, and J. M. Kennedy 1983 16 p refs Presented at a Conf. Sponsored by NASA
(DE83-010579; CONF-830805-2) Avail: NTIS HC A02/MF A01

In assessing the safety of a liquid metal fast breeder reactor (LMFBR), a major concern is the behavior of concrete structures subjected to high temperatures. The potential of concrete cracking is an important parameter which could significantly influence the safety assessment of thermally attacked concrete. A new modified j-integral approach for the blunt crack model has been derived to provide a general procedure to accurately predict the direction of crack growth. This formulation has been incorporated into the coupled heat transfer stress analysis finite element code TEMP-STRESS. A description of the formulation is presented in this paper. Results for the problems of a Mode 1 and mixed mode crack in a plate using regular and slanted meshes subjected to uniaxial and shear loading are presented. Energy release rates calculated by the J-integral agree well with the theoretical prediction for a Mode 1 crack problem with different mesh representations. However, engineering judgment and great care must be exercised in grid discretization for a mixed mode crack problem to capture the shear singularity. Author

N83-34381# Oak Ridge National Lab., Tenn.
RESULTS OF LOW DUCTILE SHELF INTERMEDIATE VESSEL TEST V-8A
R. H. Bryan 1982 13 p refs Presented at the 10th Water Reactor Safety Res. Inform. Conf., Gaithersburg, Md., 12 Oct. 1982
(Contract W-7405-eng-26)
(DE83-001956; CONF-821037-15) Avail: NTIS HC A02/MF A01

Intermediate test vessel V-8A was pressure tested hydraulically at 150 C in the twelfth test of a flawed 152 mm thick steel vessel. The tearing behavior of material having low upper shelf toughness similar to the toughness of irradiated high copper seam welds in some existing reactor pressure vessels was investigated. A tearing instability was induced and interrupted so as to obtain experimental data by which the application of methods of elastic-plastic mechanics to large structures could be evaluated. This objective was attained. Post-test examinations and evaluations of data are progressing. A preliminary assessment of results is presented. DOE

N83-34382# Pacific Northwest Lab., Richland, Wash.
PARAMETRIC CALCULATIONS OF FATIGUE-CRACK GROWTH IN PIPING
F. A. Simonen and C. W. Goodrich Mar. 1983 44 p refs
(Contract DE-AC06-76RL-01830)
(DE83-009263; NUREG/CR-3059; PNL-4537) Avail: NTIS HC A03/MF A01

A major objective of this program is to provide data that can be used to formulate recommended revisions to ASME Section 11 and regulatory requirements for inservice inspection of piping and pressure vessels. This study presents calculations of the growth of piping flaws produced by fatigue. Flaw growth was predicted as a function of the initial flaw size, the level and number of stress cycles, the piping material, and environmental factors. DOE

N83-34383# Los Alamos Scientific Lab., N. Mex.
EXPERIMENTAL BUCKLING INVESTIGATION OF RING-STIFFENED CYLINDRICAL SHELLS UNDER UNSYMMETRICAL AXIAL LOADS
W. E. Baker (New Mexico Univ.), J. G. Bennett, and C. D. Babcock (California Inst. of Technology) 1983 14 p refs Presented at the Am. Soc. of Mech. Engr. Pressure Vessel and Piping Conf., Portland, Oreg., 18-24 Jun. 1983 Sponsored in part by the Nuclear Regulatory Commission
(Contract W-7405-eng-36)
(DE83-010162; LA-UR-83-658; CONF-830607-9) Avail: NTIS HC A02/MF A01

Six steel shells having nuclear containment-like features were fabricated and loaded to failure with an offset axial load. The shells of R/t = 500 buckled plastically. Four of the shells had reinforced circular cutouts. These penetrations were sized to cut no ring-stiffener, a single, two- or three-ring stiffeners. Reinforcing and framing around the penetrations were based upon the area-replacement rule of the applicable portion of the American Society for Mechanical Engineers (ASME) Boiler and Pressure Vessel Code and were of a design to simulate actual practice for nuclear steel containments. Prior to testing, imperfections were measured and strain gages were applied to determine information on load distribution at the ends of the cylinder and strain fields at areas likely to buckle. Buckling loads were determined for an axial load applied with an eccentricity of R/2 where R is the cylinder radius. DOE

N83-34384# Technische Physische Dienst TNO-TH, Delft (Netherlands). Afd: Geluid.
STRUCTURE-BORNE SOUND TRANSFER FUNCTIONS OF A FLEXIBLE MOUNTING FOR THE S-FRIGATES DG-SET
B. vanderGraaf 16 Mar. 1983 30 p ref
(Contract A69/KM/101)
(TPD-208.900/3; TDCK-77633) Avail: NTIS HC A03/MF A01

The sound transfer function of a double-shear compression mounting commonly used in diesel installations aboard ships is investigated. The mounting is of rectangular shape 400 x 92 x 80 mm in natural rubber 55 deg shore A. The tests were made with an excitation mass of 137 Kg and a blocking mass up to 384 Kg. The frequency response of three axis linear and angular accelerations were determined for up to 1200 Hz and several loading conditions. It is shown that for some excitation directions a stiffening effect appears at 500 to 800 Hz under high static loading due to the presence of standing waves. Author (ESA)

N83-34385# Aerospace Engineering Office, Zurich (Switzerland).
EVALUATION OF EXPERIMENTAL CORRELATION PROCEDURES (FLECS 2) Final Report
K. J. Zimmermann, M. Foletta, and U. Wassermann Paris ESA 11 May 1983 64 p refs
(Contract ESTEC-4754/81/NL-AK)
(AEO-29.2-159/NT; ESA-CR(P)-1762) Avail: NTIS HC A04/MF A01

A procedure for automatic selection of degrees of freedom (df) in spacecraft dynamic tests is presented. The selection is done by neglecting rotational df, redundant rigidly coupled df, and df insignificant for describing the desired mode shapes. These are defined from an eigenvector envelope, containing all the modes within the frequency range of interest, calculated with a finite element model. The quality of the selected dynamic model is estimated from the deformations obtained from a back-substitution of the retained modal displacements into the static finite element model. These deformations are compared with the original mode set performing a cross orthogonality check. Any mode shape degradation can be deduced from the cross orthogonality matrix. The efficiency of the approach was demonstrated using a mathematical model of a spececraft dummy structure (FLECS). Results indicate that a specified set of modes can be obtained with sufficient accuracy applying a number of df which is twice the number of the desired modes. Author (ESA)

N83-34386# Technical Research Centre of Finland, Espoo. Metals Lab.
A FRACTOGRAPHIC STUDY OF CRACKS PRODUCED BY THERMAL SHOCKS IN 20MnMoNi55 AND COMPARABLE WELD MATERIAL IN WATER ENVIRONMENT
Kari Toerroenen, Markku Kemppainen, and Rauno Rintamaa Apr. 1983 28 p refs Sponsored by Finnish Ministry of Trade and Industry Prepared in cooperation with Materialpruefungsanstalt, Stuttgart
(VTT-176; ISBN-957-38-1759-8; ISSN-0358-5077) Avail: NTIS HC A03/MF A01; Technical Research Centre of Finland, Espoo FIM 25

A fractographic evaluation of weld cracks produced by thermal loading in aqueous environment was carried out. Due to heavy oxidation of the crack surfaces the initiation mechanism can not be identified. The main part of the crack propagation is shown to occur by a ductile mechanism, but deeper in the crack the growth mechanism becomes more brittle, indicating environmental assistance, and cyclic crack growth is seen. Author (ESA)

N83-34387# Fraunhofer-Inst. fuer Betriebsfestigkeit, Darmstadt (West Germany).
REVIEW OF INVESTIGATIONS OF AERONAUTICAL FATIGUE INTHE FEDERAL REPUBLIC OF GERMANY Review Period, May 1981 - April 1983
O. Buxbaum and D. Schuetz 1983 252 p refs Presented at 18th Intern. Comm. on Aeron. Fatigue (ICAF), Toulouse, 1983
(LBF-S-166; ISSN-0721-5320) Avail: NTIS HC A12/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 150

Measurement and analysis of operational loads; mathematical modeling of dynamically loaded stuctures; fatigue behavior of joints and of notched and unnotched materials; fatigue life prediction and low cycle fatigue; and crack propagation, fracture mechanics and residual static strength are reviewed. Fatigue of fiber reinforced plastics; strength degradation of composites due to environmental influences; and full scale tests, testing procedures, and test evaluation are discussed. Author (ESA)

N83-34388# Queensland Univ., Brisbane (Australia). Dept. of Civil Engineering.
BUCKLING APPROXIMATIONS FOR INELASTIC BEAMS
P. F. Dux and S. Kitipornchai Oct. 1982 41 p refs
(PB83-183400; RR-CE36) Avail: NTIS HC A03/MF A01 CSCL 20K

Hand methods of calculating buckling loads of inelastic moment gradient beams are developed. An inelastic parameter, the stiffness modification factor, J, is used to estimate equivalent uniform tangent modulus rigidities for partially yielded simply supported beams. From this is developed a buckling moment equation. For laterally continuous beams, a step by step procedure which allows for interaction between adjacent segments is proposed. The structure is reduced to a critical subassemblage of beam segments. The stiffness modification factor is used to quantify segment end interaction and an effective length factor, used to estimate the beam capacity. GRA

N83-34076# Kyushu Univ., Fukuoka (Japan). Dept. of Civil Engineering.
PLASTIC ANALYSIS OF CURVED GRILLAGE GIRDERS
Fujio Imai and Toshiaki Ohta *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 1-8 refs (For primary document see N83-34075 22-31)
Avail: NTIS HC A07/MF A01

N83-34079# Kyushu Univ., Fukuoka (Japan). Dept. of Structural Engineering.
AN EXPERIMENTAL STUDY ON INELASTIC LATERAL-TORSIONAL BUCKLING OF H-SHAPED BEAM-COLUMNS PERMITTED TO SWAY
Chiaki Matsui, Shosuke Morino, and Junichi Kimura (Fukuoka Univ.) *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 69-85 refs (For primary document see N83-34075 22-31)
Avail: NTIS HC A07/MF A01

N83-34096# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
MECHANICS AND PHYSICS OF THE GROWTH OF SMALL CRACKS
R. O. Ritchie and S. Suresh *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 14 p refs (For primary document see N83-34095 22-31)
(Grant AF-AFOSR-0181-82)
Avail: NTIS HC A10/MF A01

N83-34097# Saskatchewan Univ., Saskatoon. Dept. of Mechanical Engineering.
FATIGUE DAMAGE MECHANISMS AND SHORT CRACK GROWTH
I. LeMay *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 11 p refs Sponsored by Natural Science and Engineering Research Council of Canada (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

N83-34100*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A NONLINEAR FRACTURE MECHANICS APPROACH TO THE GROWTH OF SMALL CRACKS
J. C. Newman, Jr. *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 26 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01 CSCL 20K

N83-34101# Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany).
DAMAGE TOLERANCE EVALUATION OF STRUCTURES WITH SMALL CRACKS
Lueder Schwarmann *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 6 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

N83-34102# Royal Aircraft Establishment, Farnborough (England).
FRACTURE MECHANICS ANALYSIS OF SHORT CRACKS AT LOADED HOLES
D. P. Rooke *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 6 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

N83-34103# Nationaal Lucht-en Ruimtevaartlaboratorium, Amsterdam (Netherlands).
LIFETIME PREDICTION METHODS FOR CORNER CRACKS AT HOLES
C. J. Lof *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 9 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

N83-34104# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
PROBABILISTIC FRACTURE MECHANICS ANALYSIS METHODS FOR STRUCTURAL DURABILITY
James L. Rudd, Jann N. Yang (George Washington Univ., Washington, D.C.), Sherrell K. Manning (General Dynamics Corp., Fort Worth, Tex.) and Bill G. W. Yee (General Dynamics Corp., Fort Worth, Tex.) *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 23 p refs (For primary document see N83-34095 22-31)
(Contract F33615-77-C-3123)
Avail: NTIS HC A10/MF A01

N83-34105# Waterloo Univ. (Ontario).
THE EFFECTS OF COMPRESSIVE OVERLOADS ON THE THRESHOLD STRESS INTENSITY FOR SHORT CRACKS
P. Au, T. H. Topper, and M. L. ElHaddad *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 7 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

N83-34106# Royal Aircraft Establishment, Farnborough (England). Materials and Structures Dept.
CRACK PROPAGATION AT SHORT CRACK LENGTHS UNDER VARIABLE AMPLITUDE LOADING
R. Cook and P. R. Edwards *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 19 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

N83-34108# Douglas Aircraft Co., Inc., Long Beach, Calif.
A STUDY OF SMALL CRACK GROWTH UNDER TRANSPORT SPECTRUM LOADING
D. Y. Wang *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 15 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

N83-34109# Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn (West Germany).
SMALL CRACKS IN LARGE FORGINGS
Walter Schuetz *In* AGARD Behaviour of Short Cracks in Airframe Components Apr. 1983 17 p refs (For primary document see N83-34095 22-31)
Avail: NTIS HC A10/MF A01

42 GEOSCIENCES (GENERAL)

N83-34389 Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia). Div. of Atmospheric Research.
ERROR ANALYSIS FOR PARAMETER ESTIMATES FROM CONSTRAINED INVERSION

I. G. Enting 1983 20 p refs
(CSIRO-TP-2; ISBN-0-643-03523-0) Copyright. Avail: Issuing Activity

Constrained inversion techniques can provide a useful approach to the problem of estimating the parameters of geochemical models. These techniques can be approached in various ways which make differing statistical assumptions and which lead to different expressions for the parameter uncertainties. For models based on well-defined geophysical concepts, Bayesian analysis provides an appropriate way of using additional geophysical information in the model calibration process. Author

N83-34390# Geological Survey, Washington, D. C.
US GEOLOGICAL SURVEY PROGRAM OF OFFSHORE RESOURCE AND GEOENVIRONMENTAL STUDIES, ATLANTIC-GULF OF MEXICO REGION, FROM SEPTEMBER 1, 1976 TO DECEMBER 31, 1978
David W. Folger and Sally W. Needell [1982] 71 p refs
(GS-Circ-870; LC-82-600244) Avail: NTIS HC A04/MF A01

The scope and goals of offshore resource and geoenvironmental studies and topical investigations along the Atlantic and Gulf of Mexico coasts are described. Author

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N83-34391*# Arizona Univ., Tucson. Optical Sciences Center.
SPECTRORADIOMETRIC CALIBRATION OF THE THEMATIC MAPPER AND MULTISPECTRAL SCANNER SYSTEM Quarterly Report, 1 May - 1 Aug. 1983
Philip N. Slater, Principal Investigator and James M. Palmer 1 Aug. 1983 27 p refs ERTS
(Contract NAS5-27382)
(E83-10188; NASA-CR-173022; NAS 1.26:173022; QR-3) Avail: NTIS HC A03/MF A01 CSCL 14B

The results obtained for the absolute calibration of TM bands 2, 3, and 4 are presented. The results are based on TM image data collected simultaneously with ground and atmospheric data at White Sands, New Mexico. Also discussed are the results of a moments analysis to determine the equivalent bandpasses, effective central wavelengths and normalized responses of the TM and MSS spectral bands; the calibration of the BaSO, plate used at White Sands; and future plans. M.G.

N83-34392*# Agricultural Research Center, Beltsville, Md. Hydrology Lab.
INFORMATION CONTENT OF DATA FROM THE LANDSAT-4 THEMATIC MAPPER (TM) AND MULTISPECTRAL SCANNER (MSS) Progress Report
John C. Price [1983] 7 p ref Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(NASA Order S-10772-C)
(E83-10396; NASA-CR-172938; NAS 1.26:172938; PR-3) Avail: NTIS HC A02/MF A01 CSCL 05B

The progress of an investigation to quantify the increased information content of thematic mapper (TM) data as compared to that from the LANDSAT 4 multispectral scanner (MSS) is reported. Two night infrared images were examined and compared with Heat Capacity Mapping Mission data. M.G.

N83-34393*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
METSAT INFORMATION CONTENT: CLOUD SCREENING AND SOLAR CORRECTION INVESTIGATIONS ON THE INFLUENCE OF NOAA-6 ADVANCED VERY HIGH RESOLUTION RADIOMETER DERIVED VEGETATION ASSESSMENT
Mike L. Mathews Mar. 1983 44 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10400; NASA-CR-171682; EW-L3-04402; JSC-18606; NAS 1.26:171682; LEMSCO-19199) Avail: NTIS HC A03/MF A01 CSCL 04B

The development of the cloud indicator index (CII) for use with METSAT's advanced very high resolution radiometer (AVHRR) is described. The CII is very effective at identification of clouds. Also, explored are different solar correction and standard techniques and the impact of these corrections have on the information content of AVHRR data. Author

N83-34394*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
DATA MANAGEMENT PROCEDURES FOR TIEPOINT REGISTRATION, PRE AND POST PROCESSING, AND ICD116
B. S. Nowakowski Jun. 1983 48 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10401; NASA-CR-171688; SR-L3-04430; JSC-18886; NAS 1.26:171688; LEMSCO-19428) Avail: NTIS HC A03/MF A01 CSCL 05B

The data management procedures for tiepoint registration, pre and post processing, and 'ICD116' are described. With each procedure description, the pertinent execs are listed and purposes defined. An example run of each of the 32 execs is included with user inputs identified. M.G.

N83-34395*# Southern Methodist Univ., Dallas, Tex. Center for Applied Mathematical and Statistical Research.
A COMPARISON OF MINIMUM DISTANCE AND MAXIMUM LIKELIHOOD TECHNIQUES FOR PROPORTION ESTIMATION
Wayne A. Woodward, William R. Schucany, Hildegard Lindsey, and H. L. Gray Nov. 1982 29 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development
(Contract NAS9-16438; Proj. AgRISTARS)
(E83-10402; NASA-CR-171678; SR-62-04376; NAS 1.26:171678) Avail: NTIS HC A03/MF A01 CSCL 05B

The estimation of mixing proportions P sub 1, P sub 2,...P sub m in the mixture density f(x) = the sum of the series P sub i F sub i(X) with i = 1 to M is often encountered in agricultural remote sensing problems in which case the p sub i's usually represent crop proportions. In these remote sensing applications, component densities f sub i(x) have typically been assumed to be normally distributed, and parameter estimation has been accomplished using maximum likelihood (ML) techniques. Minimum distance (MD) estimation is examined as an alternative to ML where, in this investigation, both procedures are based upon normal components. Results indicate that ML techniques are superior to MD when component distributions actually are normal, while MD estimation provides better estimates than ML under symmetric departures from normality. When component distributions are not symmetric, however, it is seen that neither of these normal based techniques provides satisfactory results. M.G.

N83-34396*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
SEPARABILITY OF AGRICULTURAL CROPS WITH AIRBORNE SCATTEROMETRY
Naresh C. Mehta Jun. 1983 61 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10403; NASA-CR-171673; SR-L3-04428; NSC-18885; NAS 1.26:171673; LEMSCO-19422) Avail: NTIS HC A04/MF A01 CSCL 02C

Backscattering measurements were acquired with airborne scatterometers over a site in Cass County, North Dakota on four days in the 1981 crop growing season. Data were acquired at three frequencies (L-, C- and Ku-bands), two polarizations (like

and cross) and ten incidence angles (5 degrees to 50 degrees in 5 degree steps). Crop separability is studied in an hierarchical fashion. A two-class separability measure is defined, which compares within-class to between-class variability, to determine crop separability. The scatterometer channels with the best potential for crop separability are determined, based on this separability measure. Higher frequencies are more useful for discriminating small grains, while lower frequencies tend to separate non-small grains better. Some crops are more separable when row direction is taken into account. The effect of pixel purity is to increase the separability between all crops while not changing the order of useful scatterometer channels. Crude estimates of separability errors are calculated based on these analyses. These results are useful in selecting the parameters of active microwave systems in agricultural remote sensing. M.G.

N83-34397*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
THE 1980 US/CANADA WHEAT AND BARLEY EXPLORATORY EXPERIMENT, VOLUME 1 Final Report
R. M. Bizzell, H. L. Prior, R. W. Payne, and J. M. Disler Apr. 1983 94 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development Prepared in cooperation with NASA. Johnson Space Center ERTS 2 Vol.
(Contract NAS8-15800; Proj. AgRISTARS)
(E83-10404; NASA-CR-171674; IT-L3-04398; JSC-18602; NAS 1.26:171674; LEMSCO-18629) Avail: NTIS HC A05/MF A01 CSCL 02C

The results from the U.S./Canada Wheat and Barley Exploratory Experiment which was completed during FY 1980 are presented. The results indicate that the new crop identification procedures performed well for spring small grains and that they are conductive to automation. The performance of the machine processing techniques shows a significant improvement over previously evaluated technology. However, the crop calendars will require additional development and refinements prior to integration into automated area estimation technology. The evaluation showed the integrated technology to be capable of producing accurate and consistent spring small grains proportion estimates. However, barley proportion estimation technology was not satisfactorily evaluated. The low-density segments examined were judged not to give indicative or unequivocal results. It is concluded that, generally, the spring small grains technology is ready for evaluation in a pilot experiment focusing on sensitivity analyses to a variety of agricultural and meteorological conditions representative of the global environment. It is further concluded that a strong potential exists for establishing a highly efficient technology or spring small grains. M.G.

N83-34398*# Environmental Research Inst. of Michigan, Ann Arbor. Infrared and Optics Div.
DEVELOPMENT, IMPLEMENTATION AND EVALUATION OF SATELLITE-AIDED AGRICULTURAL MONITORING SYSTEMS Final Report, 1 Nov. 1981 - 31 Oct. 1982
Robert Cicone, Principal Investigator, E. Crist, M. Metzler, and T. Parris Nov. 1982 111 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-16538; Proj. AgRISTARS)
(E83-10405; NASA-CR-171679; IT-E2-04377; NAS 1.26:171679; ERIM-160300-35-F) Avail: NTIS HC A06/MF A01 CSCL 14B

Research supporting the use of remote sensing for inventory and assessment of agricultural commodities is summarized. Three task areas are described: (1) corn and soybean crop spectral/temporal signature characterization; (2) efficient area estimation technology development; and (3) advanced satellite and sensor system definition. Studies include an assessment of alternative green measures from MSS variables; the evaluation of alternative methods for identifying, labeling or classification targets in an automobile procedural context; a comparison of MSS, the advanced very high resolution radiometer and the coastal zone color scanner, as well as a critical assessment of thematic mapper dimensionally and spectral structure. Author

N83-34399*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
THE 1980 US/CANADA WHEAT AND BARLEY EXPLORATORY EXPERIMENT. VOLUME 2: ADDENDA Final Report
R. M. Bizzell, H. L. Prior, R. W. Payne, and J. M. Disler Apr. 1983 158 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development Prepared in cooperation with NASA. Johnson Space Center ERTS 2 Vol.
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10406; NASA-CR-171675; IT-L3-04398; JSC-18602; NAS 1.26:171675; LEMSCO-18629) Avail: NTIS HC A08/MF A01 CSCL 02C

Three study areas supporting the U.S./Canada Wheat and Barley Exploratory Experiment are discussed including an evaluation of the experiment shakedown test analyst labeling results, an evaluation of the crop proportion estimate procedure 1A component, and the evaluation of spring wheat and barley crop calendar models for the 1979 crop year. M.G.

N83-34400*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
ARGENTINA SPECTRAL-AGRONOMIC MULTITEMPORAL DATA SET
D. Helmer, C. Kinzler, M. A. Tomppkins, and G. D. Badhwar Jun. 1983 46 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development Prepared in cooperation with NASA. Johnson Space Center ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10407; NASA-CR-171683; SR-L3-04426; JSC-18884; NAS 1.26:171683; LEMSCO-19539) Avail: NTIS HC A03/MF A01 CSCL 02C

A multitemporal LANDSAT spectral data set was created. The data set is over five 5 nm-by-6 nm areas over Argentina and contains by field, the spectral data, vegetation type and cloud cover information. Author

N83-34401*# Kansas Univ., Lawrence. Space Technology Center.
AN INVENTORY OF STATE NATURAL RESOURCES INFORMATION SYSTEMS
Loyola M. Caron and Debora Sidor Apr. 1983 28 p refs ERTS (Grant NAG2-201)
(E83-10408; NASA-CR-166509; NAS 1.26:166509) Avail: NTIS HC A03/MF A01 CSCL 05B

The status of a project to inventory state natural resources information systems is summarized. All tasks accomplished are described, and tasks remaining to be completed are outlined. A.R.H.

N83-34402*# California Univ., Berkeley. Space Sciences Lab.
ANALYSIS OF THE QUALITY OF IMAGE DATA ACQUIRED BY THE LANDSAT-4 THEMATIC MAPPER AND MULTISPECTRAL SCANNERS Quarterly Status and Technical Progress Report, 1 Apr. - 30 Jun. 1983
Robert N. Colwell, Principal Investigator 10 Aug. 1983 9 p ERTS
(Contract NAS5-27377)
(E83-10410; NASA-CR-173004; NAS 1.26:173004; QSTPR-2) Avail: NTIS HC A02/MF A01 CSCL 05B

The three types of LANDSAT 4 film products generally accessible to the user community were analyzed and attempts were made to acquire a data set consisting of a variety of TM and MSS image products for the Sacramento and San Francisco Bay Area test sites. On request, the EDC developed an interim TM analytical film by using a leaser beam recorder to produce black and white masters from which natural and false color composites were created. A.R.H.

N83-34403*# Geosat Committee, Inc., San Francisco, Calif.
RECOMMENDATIONS CONCERNING SATELLITE-ACQUIRED EARTH RESOURCE DATA: 1982 REPORT OF THE DATA MANAGEMENT SUBCOMMITTEE OF THE GEOSAT COMMITTEE, INCORPORATED
Nov. 1982 54 p Sponsored by NASA ERTS
(E83-10411; NASA-CR-173005; NAS 1.26:173005) Avail: NTIS HC A04/MF A01 CSCL 05B

End user concerns about the content and accessibility of libraries of remote sensing data in general are addressed. Recommendations pertaining to the United States' satellite remote sensing programs urge: (1) the continuation of the NASA/EROS Data Center program to convert pre-1979 scenes to computer readable tapes and create a historical archive of this valuable data; (2) improving the EROS archive by adding geologically interesting scenes, data from other agencies (including previously classified data), and by adopting a policy to retire data from the archive; (3) establishing a computer data base inquiry system that includes remote sensing data from all publically available sources; (4) capability for prepurchase review and evaluation; (5) a flexible price structure; and (6) adoption of standard digital data products format. Information about LANDSAT 4, the status of worldwide LANDSAT receiving stations, future non-U.S. remote sensing satellites, a list of sources for LANDSAT data, and the results of a survey of GEOSAT members' remote sensing data processing systems are also considered. A.R.H.

N83-34404*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PERFORMANCE EVALUATION AND GEOLOGIC UTILITY OF LANDSAT 4 TM AND MSS SCANNERS Quarterly Report, 4 Feb. - 4 Aug. 1983
Helen N. Paley Aug. 1983 21 p refs Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10412; NASA-CR-173006; NAS 1.26:173006) Avail: NTIS HC A02/MF A01 CSCL 08G

Experiments using artificial targets (polyethylene sheets) to help calibrate and evaluate atmospheric effects as well as the radiometric precision and spatial characteristics of the NS-001 and TM sensor systems were attempted and show the technical feasibility of using plastic targets for such studies, although weather precluded successful TM data acquisition. Tapes for six LANDSAT 4 TM scenes were acquired and data processing began. Computer enhanced TM simulator and LANDSAT 4 TM data were compared for a porphyry copper deposit in Southern Arizona. Preliminary analyses performed on two TM scenes acquired in the CCT-PT format, show the TM data appear to contain a marked increase in geologically useful information; however, a number of instrumental processing artifacts may well limit the ability of the geologist to fully extract this information. A.R.H.

N83-34405*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
LANDSAT-4 IMAGE DATA QUALITY ANALYSIS
P. E. Anuta, Principal Investigator 9 Aug. 1983 7 p ERTS
(Contract NAS5-26859)
(E83-10413; NASA-CR-173007; NAS 1.26:173007;
LARS-CR-080983) Avail: NTIS HC A02/MF A01 CSCL 05B

Seven heterogeneous areas within the entire Des Moines, Iowa test site were selected to define candidate spectral training classes using a clustering algorithm. In addition to the 91 cluster nonsupervised classes, three supervised training classes were defined. The original candidate training classes were reduced to 42 spectrally separable training classes. The minimum and average transformed divergence values for the 42 spectral classes and for the best subsets of Y TM spectral bands are shown in a table. The best spectral band for any combination of 1 through 7 bands is the first middle IR band. The next best band is the near IR, followed by the red band and than the thermal IR. The best combination of four bands includes one from each of the four regions of the spectrum (visible, near IR, middle IR, and thermal IR). A.R.H.

N83-34406*# Texas A&M Univ., College Station. Remote Sensing Center.
A MATHEMATICAL CHARACTERIZATION OF VEGETATION EFFECT ON MICROWAVE REMOTE SENSING FROM THE EARTH Quarterly Report
Y. Choe and L. Tsang Aug. 1983 115 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Grant NAG5-31; Proj. AgRISTARS)
(E83-10415; NASA-CR-173051; SM-T3-04436; NAS 1.26:173051; RSC-139) Avail: NTIS HC A06/MF A01 CSCL 02C

In passive microwave remote sensing of the earth, a theoretical model that utilizes the radiative transfer equations was developed to account for the volume scattering effects of the vegetation canopy. Vegetation canopies such as alfalfa, sorghum, and corn are simulated by a layer of ellipsoidal scatterers and cylindrical structures. The ellipsoidal scatterers represent the leaves of vegetation and are randomly positioned and oriented. The orientation of ellipsoids is characterized by a probability density function of Eulerian angles of rotation. The cylindrical structures represent the stalks of vegetation and their radii are assumed to be much smaller than their lengths. The underlying soil is represented by a half-space medium with a homogeneous permittivity and uniform temperature profile. The radiative transfer quations are solved by a numerical method using a Gaussian quadrature formula to compute both the vertical and horizontal polarized brightness temperature as a function of observation angle. The theory was applied to the interpretation of experimental data obtained from sorghum covered fields near College Station, Texas. M.G.

N83-34407*# National Aeronautics and Space Administration, Washington, D. C.
PLANET EARTH THROUGH EYES OF LANDSAT 4
1983 12 p Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10416; NASA-FACTS-138/3-83; NAS 1.20:138/3-83) Avail: NTIS MF A01; HC SOD CSCL 05B

A brief overview of the imaging capabilities of LANDSAT 4 is given. False color images of various cities, forests, farmland areas, and deserts are presented and the specific features revealed in each are pointed out. M.G.

N83-34408*# Nebraska Univ., Lincoln. Inst. of Agriculture and Natural Resources.
FIELD MEASUREMENTS, SIMULATION MODELING AND DEVELOPMENT OF ANALYSIS FOR MOISTURE STRESSED CORN AND SOYBEANS, 1982 STUDIES Progress Report, 1 Feb. 1982 - 31 May 1983
Blaine L. Blad, John M. Norman, and Bronson R. Gardner Jun. 1983 296 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-16636; Proj. AgRISTARS)
(E83-10417; NASA-CR-171692; SR-83-04429; NAS 1.26:171692; CAMaC-83-5) Avail: NTIS HC A13/MF A01 CSCL 02C

The experimental design, data acquisition and analysis procedures for agronomic and reflectance data acquired over corn and soybeans at the Sandhills Agricultural Laboratory of the University of Nebraska are described. The following conclusions were reached: (1) predictive leaf area estimation models can be defined which appear valid over a wide range of soils; (2) relative grain yield estimates over moisture stressed corn were improved by combining reflectnce and thermal data; (3) corn phenology estimates using the model of Badhwar and Henderson (1981) exhibited systematic bias but were reasonably accurate; (4) canopy reflectance can be modelled to within approximately 10% of measured values; and (5) soybean pubescence significantly affects canopy reflectance, energy balance and water use relationships. M.G.

N83-34409*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

EFFECT OF LEAF VARIABLES ON VISIBLE, NEAR-INFRARED AND MID-INFRARED REFLECTANCE OF EXCISED LEAVES
R. Bell, M. L. Labovitz, and R. W. Ludwig (Maryland Univ.) Jul. 1983 23 p refs ERTS
(E83-10424; NASA-TM-85076; NAS 1.15:85076) Avail: NTIS HC A02/MF A01 CSCL 02F

Effects of an imposed (excised) leaf orientation, differing species and differing venation patterns on reflectance measurements in the LANDSAT-4 thematic mapper (TM) channels TM3 (0.63 to 0.69 microns), TM4 (0.76 to 0.90 microns), and TM5 (1.55 to 1.75 microns) were investigated. Orientation of leaves (random vs. systematic placement) was found to affect measurements in the TM4 channel, but not the TM3 and TM5 measurements. Venation caused no significant changes for any band. Azimuth of incident radiation was not a significant main effect, but in conjunction with changes in orientation, angle did have a significant effect on reflectance values in TM3, TM4 and TM5. Specific differences were highly significant ($P > f <$ or $= 0.006$) in all but one borderline ($P > F <$ or $= 0.0222$) case for TM5. For spectral examination of excised leaves, the sampling arrangement of the leaves should as closely approximate in situ positioning as possible (with respect to remote sensing instrumentation). This dictates a random rather than aligned arrangement. M.G.

N83-34410*# Kansas Univ., Lawrence. Remote Sensing Lab.
RELATING THE RADAR BACKSCATTERING COEFFICIENT TO LEAF-AREA INDEX
Fawwaz T. Ulaby, Principal Investigator, C. Allen, G. Eger, and E. Kanemasu Apr. 1983 66 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15421; Proj. AgRISTARS)
(E83-10425; NASA-CR-171690; SR-K3-04432; NAS 1.26:171690; RSL-TR-360-20) Avail: NTIS HC A04/MF A01 CSCL 02C

The relationship between the radar backscattering coefficient of a vegetation canopy, sigma(0) sub can, and the canopy's leaf area index (LAI) is examined. The relationship is established through the development of a model for corn and sorghum and another for wheat. Both models are extensions of the cloud model of Attema and Ulaby (1978). Analysis of experimental data measured at 8.6, 13.0, 17.0, and 35.6 GHz indicates that most of the temporal variations of sigma(0) sub can can be accounted for through variations in green LAI alone, if the latter is greater than 0.5. M.G.

N83-34411*# Maryland Univ., College Park. Remote Sensing Systems Lab.
THE CONTINUOUS SIMILARITY MODEL OF BULK SOIL-WATER EVAPORATION
Roger B. Clapp Apr. 1983 55 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E83-10426; NASA-CR-173056; CP-53-04417; NAS 1.26:173056) Avail: NTIS HC A04/MF A01 CSCL 02C

The continuous similarity model of evaporation is described. In it, evaporation is conceptualized as a two stage process. For an initially moist soil, evaporation is first climate limited, but later it becomes soil limited. During the latter stage, the evaporation rate is termed evaporability, and mathematically it is inversely proportional to the evaporation deficit. A functional approximation of the moistuure distribution within the soil column is also included in the model. The model was tested using data from four experiments conducted near Phoenix, Arizona; and there was excellent agreement between the simulated and observed evaporation. The model also predicted the time of transition to the soil limited stage reasonably well. For one of the experiments, a third stage of evaporation, when vapor diffusion predominates, was observed. The occurrence of this stage was related to the decrease in moisture at the surface of the soil. The continuous similarity model does not account for vapor flow. The results show that climate, through the potential evaporation rate, has a strong influence on the time of transition to the soil limited stage. After this transition, however, bulk evaporation is independent of climate until the effects of vapor flow within the soil predominate. M.G.

N83-34412*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SHUTTLE IMAGING RADAR-C (SIR-C): EXECUTIVE SUMMARY
1 Jul. 1983 16 p refs Sponsored by NASA
(NASA-CR-172988; JPL-83-47; NAS 1.26:172988) Avail: NTIS HC A02/MF A01 CSCL 08B

The scientific and technological objectives of the Shuttle Imaging Radar-C (SIR-C) Project are reviewed. Information regarding the implementation philosophy and approach, and the relationship of the project to the overall SIR program is also provided. Author

N83-34413*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LITERATURE RELEVANT TO REMOTE SENSING OF WATER QUALITY
Elizabeth M. Middleton and Richard F. Marcell Jul. 1983 98 p Submitted for publication
(NASA-TM-85077; NAS 1.15:85077) Avail: NTIS HC A05/MF A01 CSCL 08H

References relevant to remote sensing of water quality were compiled, organized, and cross-referenced. The following general categories were included: (1) optical properties and measurement of water characteristics; (2) interpretation of water characteristics by remote sensing, including color, transparency, suspended or dissolved inorganic matter, biological materials, and temperature; (3) application of remote sensing for water quality monitoring; (4) application of remote sensing according to water body type; and (5) manipulation, processing and interpretation of remote sensing digital water data. S.L.

N83-34414*# Old Dominion Univ., Norfolk, Va. Dept. of Electrical Engineering.
INVESTIGATION OF ANALYTICAL METHODS FOR EFFICIENT PARTITIONING OF ON-BOARD PROCESSING FUNCTIONS FOR REMOTE SENSING APPLICATIONS Final Report, 5 Sep. 1980 - 5 Sep. 1981
David Livingston and John W. Stoughton Sep. 1983 15 p refs (Contract NAS1-15648)
(NASA-CR-163058; NAS 1.26:163058) Avail: NTIS HC A02/MF A01 CSCL 05B

Risk decomposition and ring theory, lattice techniques and universal algebras, and unary functions are considered. Author

N83-34415# European Space Agency, Paris (France).
FIRST INTERNATIONAL TRAINING SEMINAR ON REMOTE SENSING APPLICATIONS TO OPERATIONAL AGROMETEOROLOGY IN SEMI-ARID COUNTRIES [PREMIER SEMINAIRE INTERNATIONAL DE FORMATION SUR LES APPLICATIONS DE LA TELEDETECTION A L'AGRO-METEOROLOGIE OPERATIONNELLE DANS LES PAYS SEMI-ARIDES]
T. D. Guyenne, ed. Jul. 1983 75 p refs In FRENCH; ENGLISH summary Seminar held at Niamey, Nigeria, 11-29 Jul. 1983; sponsored by UN, WMO, ESA and FAO
(ESA-SP-1051; ISSN-0379-6566) Avail: NTIS HC A04/MF A01; ESA, Paris FF 60

The state of the art of agrometeorology and remote sensing; choice of different spectral bands for LANDSAT imagery; interpretation of satellite imagery; use of satellite remote sensing for locust control, flood plain mapping and rice crop prediction in West Africa; estimation of precipitation; and measurement of soil moisture and evaporation were discussed. For individual titles, see N83-34416 through N83-34425.

N83-34416# World Meteorological Organization, Geneva (Switzerland).
AGROMETEOROLOGY: STATE OF PROGRESS, GOALS [LA METEOROLOGIE AGRICOLE: SON ETAT D'AVANCEMENT, SES BUTS]

D. Rijks *In* ESA First Intern. Training Sem. on Remote Sensing Appl. to Operational Agrometeorol. in Semi-Arid Countries Jul. 1983 p 1-5 In FRENCH (For primary document see N83-34415 22-43)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 60

Agrometeorological techniques are listed along with areas where remote sensing can improve them. Remote sensing is particularly useful for measuring radiation budgets, rainfall analysis, wind measurement, crop monitoring, tracking insect swarms, and thematic mapping of the surface. The medium term aims of agrometeorology are to describe the atmospheric environment of agricultural areas, to describe plant and animal responses to meteorological parameters, and to collate results of these studies. Author (ESA)

N83-34417# United Nations, New York, N. Y. Div. de l'Espace Extra-Atmospherique.
GENERAL TALK ON REMOTE SENSING: STATE OF THE ART [EXPOSE GENERAL SUR LA TELEDETECTION: DERNIER ETAT DES CONNAISSANCES EN LA MATIERE]
R.-P. Oesberg *In* ESA First Intern. Training Sem. on Remote Sensing Appl. to Operational Agrometeorol. in Semi-Arid Countries Jul. 1983 p 7-14 In FRENCH (For primary document see N83-34415 22-43)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 60

Satellite-borne remote sensing of Earth resources and the environment, and the role of the UN African Economic Commission in remote sensing program development are discussed. Active and passive systems are described, and the trend towards multichannel, multipurpose satellites is noted. Integrated specialized satellite/ground support network systems are suggested as a cheaper option for agrometeorology. The use of Fourier spectrometers and multifrequency radiometers to overcome problems caused by clouds is described. Author (ESA)

N83-34418# United Nations, New York, N. Y. Div. de l'Espace Extra-Atmospherique.
PHYSICAL BASES OF REMOTE SENSING [BASES PHYSIQUES DE LA TELEDETECTION]
R.-P. Oesberg *In* ESA First Intern. Training Sem. on Remote Sensing Appl. to Operational Agrometeorol. in Semi-Arid Countries Jul. 1983 p 15-17 refs In FRENCH (For primary document see N83-34415 22-43)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 60

The physics of electromagnetic energy, electromagnetic spectra, electromagnetic energy sources, atmospheric perturbation and absorption, diffusion and diffraction; and atmospheric emission are sketched. The effects of pigments, leaf structure, and humidity on the reflectance of vegetation are summarized. Author (ESA)

N83-34419# Food and Agriculture Organization of the United Nations, Rome (Italy). Centre de Teledetection.
CHOICE OF DIFFERENT SPECTRAL BANDS (WORKSHOP) [CHOIX DE DIFFERENTES BANDES DE LONGUEUR D'ONDES (ATELIER)]
C. Travaglia *In* ESA First Intern. Training Sem. on Remote Sensing Appl. to Operational Agrometeorol. in Semi-Arid Countries Jul. 1983 p 19-21 In FRENCH (For primary document see N83-34415 22-43)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 60

Evaluation of LANDSAT black and white and color images for Earth resources use is discussed. The characteristics and gray shades of landforms as they appear in LANDSAT images are outlined. The best bandwidth for a particular analysis, e.g., roads or land use, is indicated. Author (ESA)

N83-34420# Food and Agriculture Organization of the United Nations, Rome (Italy). Centre de Teledetection.
THE PRINCIPLES OF INTERPRETING SATELLITE IMAGERY [LES PRINCIPES D'INTERPRETATION DES IMAGES SATELLITE]
C. Travaglia *In* ESA First Intern. Training Sem. on Remote Sensing Appl. to Operational Agrometeorol. in Semi-Arid Countries Jul. 1983 p 23-25 refs In FRENCH (For primary document see N83-34415 22-43)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 60

The availability of LANDSAT multispectral scanner images, and the forms in which they are presented are described. Images are available as: 70 mm, black and white (bw) 1/3, 369.000 scale positive transparencies analyzed using a viewer; positive and negative 19 cm bw 1/1 million transparencies, analyzed on a viewing table; bw prints at 1/1 million, 1/5 million and 1/250,000 scales; false color composites as slides (1/1 million) and prints (1/1 million, 1/5 million, 1/250,000); and as 35 mm slides. Each image covers 34,000 sq km. Each point is covered every 18 days. Author (ESA)

N83-34421# Food and Agriculture Organization of the United Nations, Rome (Italy). Plant Protection Service.
OPERATIONAL USE OF SATELLITE REMOTE SENSING FOR FORECASTING AND CONTROL OF LOCUSTS AT INTERNATIONAL, REGIONAL, AND NATIONAL LEVELS [L'UTILISATION OPERATIONELLE DE LA TELEDETECTION PAR SATELLITE POUR LA PREVISION ET LA LUTTE CONTRE LE CRIQUET PELERIN AUX NIVEAUX INTERNATIONAL, REGIONAL ET NATIONAL]
J. U. Hielkema *In* ESA First Intern. Training Sem. on Remote Sensing Appl. to Operational Agrometeorol. in Semi-Arid Countries Jul. 1983 p 27-29 refs In FRENCH (For primary document see N83-34415 22-43)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 60

The use of satellites for thematic mapping of locust breeding grounds and habitats is discussed. The METEOSAT, NOAA, and LANDSAT satellites supply useful data for locust monitoring and control. The use of nonparametric techniques for analysis of ecological data is advocated. Experimental and semioperational locust control programs using satellites are very encouraging. Author (ESA)

N83-34422# Canada Centre for Remote Sensing, Ottawa (Ontario).
TRACKING OF WATER LEVELS AND MAPPING OF FLOOD PLAINS [LE SUIVI DES PLANS D'EAU ET LA CARTOGRAPHIE DES PLANS INONABLES]
K. P. B. Thomson and C. Prevost *In* ESA First Intern. Training Sem. on Remote Sensing Appl. to Operational Agrometeorol. in Semi-Arid Countries Jul. 1983 p 31-35 refs In FRENCH (For primary document see N83-34415 22-43)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 60

Satellite mapping in hydrology is introduced, especially for West Africa. The spectral characteristics of water are summarized. In West Africa, LANDSAT data are more useful than those of NOAA or METEOSAT, because of LANDSAT's higher image resolution and readily available data. Interpretation of water level data for the Sahel is complicated by vegetation which persist after the monsoon, hiding the true extent of the water. In the near infrared, burnt land has a reflectance similar to water. Visual interpretation and manual plotting are the most economical methods for morphological and hydrological mapping and for analyzing the environment. Author (ESA)

N83-34423# Joint Research Centre of the European Communities, Ispra (Italy).
POTENTIAL AND LIMITATIONS OF REMOTE SENSING FOR CROP FORECASTING WITH AGROMETEOROLOGICAL MODELS INCLUDED: RICE GROWING IN WEST AFRICA [POTENTIALITES ET LIMITATIONS DE LA TELEDETECTION POUR LA PREVISION DES RECOLTES, AVEC INCLUSIONS DE MODELES AGRO-METEOROLOGIQUES: EXEMPLE DE LA RIZICULTURE EN AFRIQUE DE L'OUEST]
A. Berg *In* ESA First Intern. Training Sem. on Remote Sensing Appl. to Operational Agrometeorol. in Semi-Arid Countries Jul. 1983 p 37-49 In FRENCH (For primary document see N83-34415 22-43)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 60

The economic and technological feasibility of satellite-borne

crop monitoring in West Africa is discussed. Experience acquired during the Large Area Crop Inventory Experiment and AGRESTE program (using LANDSAT) is summarized. The use of the radiation energy budget to forecast yield is outlined. A regional (Mali-Guinea) experiment using LANDSAT data in rice farming suggests that satellite imagery is technologically feasible, but if it is to be economically viable it must be extended to the other cereals of the area. Author (ESA)

N83-34424# Reading Univ. (England). Dept. of Meteorology.
MEASURING SOIL MOISTURE AND EVAPORATION [MESURE DE L'HUMIDITE DU SOL ET DE L'EVAPORATION]
G. Dugdale *In* ESA First Intern. Training Sem. on Remote Sensing Appl. to Operational Agrometeorol. in Semi-Arid Countries Jul. 1983 p 51-54 refs In FRENCH (For primary document see N83-34415 22-43)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 60

The use of satellites to acquire hydrometeorological data in tropical and subtropical regions with few meteorological or agrometeorological stations is discussed. Three methods for satellite mapping of soil humidity and evaporation are discussed. The methods are based on determination of the surface energy balance using a continuous model; on daily means; and on directly linking soil humidity to thermal inertia, estimated by remote sensing. The major difficulty with all the methods is estimating atmospheric transmission of infrared radiation for a given atmospheric window. Author (ESA)

N83-34425# Reading Univ. (England). Dept. of Meteorology.
PRECIPITATION ESTIMATION [ESTIMATION DES PRECIPITATIONS] c47
G. Dugdale *In* ESA First Intern. Training Sem. on Remote Sensing Appl. to Operational Agrometeorol. in Semi-Arid Countries Jul. 1983 p 55-70 refs In FRENCH (For primary document see N83-34415 22-43)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 60

Radar, microwave radiometer, visual and infrared remote sensing of rainfall is reviewed. Cloud index, cloud history, and combined radar/satellite techniques are introduced. Applications in West Africa are discussed. The advantages of polar versus geostationary orbits for remote sensing are summarized. The high cost of calibrated radar eliminates it for most West African countries. Since most of the rain falls at night, and since a 9 to 15 hr development period is normal, the use of infrared sensors on board geostationary satellites is recommended. Author (ESA)

N83-34426# Coast Guard Research and Development Center, Groton, Conn.
AERIAL PHOTOGRAPHIC SURVEYS ANALYZED TO DEDUCE OIL SPILL MOVEMENT DURING THE DECAY AND BREAKUP OF FAST ICE, PRUDHOE BAY, ALASKA Final Report
Ivan M. Lissauer and Denise A. Baird Sep. 1982 60 p ref
(AD-A126395; CGR/DC-21/82; CG-D-51-82) Avail: NTIS HC A04/MF A01 CSCL 08/12

During the summers of 1979 and 1980 aerial photographs of the land fast ice north of Prudhoe Bay, Alaska, were taken. These photographs, covering two week periods, highlight the decay and break-up of the land fast ice sheet. During the period of photography, wind speed, wind direction, barometric pressure, and tidal height measurements were recorded continuously. Several larger ice floes were 'tagged' with colored plywood markers during 1979. Both these marked flows and other distinctively shaped floes were tracked on the photographic surveys to determine the effect the wind had on their movement. Within the barrier islands, average ice floe velocities as a percentage of wind speed exceeded the 3.5% figure 'normally' found in the literature. North of these islands average ice floe velocities as a percentage of wind speed were less than the 3.5% value. In addition to the flow drift calculations the photographs provide information on melt pool formation and a comparison of the decay and breakup processes between the 1979 and 1980 seasons. The decay and breakup process appears to be triggered by strong wind events in early July. Author

N83-34427# Anacapa Sciences, Inc., Santa Barbara, Calif.
COGNITIVE PROCESSES IN THE INTERPRETATION OF THE CONTOUR-LINE PORTRAYAL OF TERRAIN RELIEF Technical Report, 1 May 1980 - 31 Dec. 1982
Kenneth D. Cross, Steven M. Rugge, and Perry W. Thorndyke (Perceptronics, Inc.) Dec. 1982 107 p refs
(Contract N00014-80-C-0508; NR Proj. 157-454)
(AD-A126403; Rept-429-1) Avail: NTIS HC A06/MF A01 CSCL 08/6

Military map users must be capable of interpreting all classes of features portrayed on topographic maps, the interpretation of the contour-line portrayal of terrain relief (traditionally referred to as contour interpretation) is clearly the most difficult and most important part of the map-interpretation task. The objectives of this research are to (1) gain a more thorough understanding of the fundamental cognitive processes underlying one type of contour-interpretation task, and (2) apply this knowledge in defining improved strategies for teaching this important skill. The contour-interpretation task investigated-referred to as 'position fixing' required subjects to locate their position on a map after being transported blindfolded to test sites where terrain relief is the only topographic feature available for referencing. A group of six Marine Corps infantrymen, selected because of their acknowledged expertise in map interpretation, exhibited a uniformly high level of skill and a uniform problem-solving strategy. The strategy employed by the experts involved the use of large landforms (macrorelief) to reduce the size of the area-of-uncertainty. Then, small landforms (microrelief) were used to pinpoint on the map their exact location. B.W.

N83-34428# Army Engineer Topographic Labs., Fort Belvoir, Va.
INFORMATION-THEORETIC SURFACE MODELING
Cyrus C. Taylor and Steven W. Norton 1983 12 p refs Presented at the ACSM-ASP Conv., Washington, D.C., 13-18 Mar. 1983
(AD-A128189; ETL-R046) Avail: NTIS HC A02/MF A01 CSCL 08/2

The problem of estimating the form of a surface, given a set of points lying on that surface, is a fundamental concern in automated cartography. A good deal of effort has been spent investigating the problem by using particular terrain modeling schemes, but no general approach has previously been developed. In this paper, we examine the problem of terrain estimation from an information-theoretic viewpoint. Geometric analysis shows that there is an essentially unique criterion for the optimal choice of an estimated terrain surface given limited knowledge of that surface. We briefly review this theory, and then turn to the practical question of developing versatile and efficient software for manipulating terrain elevation data based on the information-theoretic analysis. The contour to grid estimation system CONTOGES was implemented at the U.S. Army Engineer Topographic Laboratories (USAETL) as a preliminary check of the theoretical work. We discuss the particular algorithm and the results of a test of the software system. Author (GRA)

N83-34429# Analytic Sciences Corp., Reading, Mass.
MULTISENSOR APPROACHES FOR DETERMINING DEFLECTIONS OF THE VERTICAL Final Technical Report, 1 Dec. 1981 - 31 Dec. 1982
W. G. Heller and K. B. MacNichol Jan. 1983 80 p refs
(Contract DAAK70-82-C-0011)
(AD-A128412; TASC-TR-4051-2; ETL-0314) Avail: NTIS HC A05/MF A01 CSCL 08/5

This final report documents the second phase of a study of methods for determining deflections of the vertical. In this phase multisensor techniques involving astrogeodetic, gravimetric, inertial, and gradiometric methods have been examined. The combination approaches discussed herein are those found to offer most promise in terms of accuracy, logistical convenience, and/or cost. Specific techniques treated in detail are the astrogeodetic method approached from a minimum variance estimation context, alternative moving base measurement techniques using supplemental astrogeodetic data, and regional adjustment of multiple tracks of inertial survey system measurements. Cost and logistical considerations

for key single and multisensor deflection determination alternatives are reviewed. Author (GRA)

N83-34430# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
ATMOSPHERE EFFECTS IN SATELLITE IMAGING OF MOUNTAINOUS TERRAIN M.S. Thesis
Robert W. Sjoberg Sep. 1982 93 p refs
(Contract N00014-80-C-0505)
(AD-A128431; AI-TR-688) Avail: NTIS HC A05/MF A01 CSCL 22/2

It is possible to obtain useful maps of surface albedo from remotely-sensed images by eliminating effects due to topography and the atmosphere, even when the atmospheric state is not known. A simple phenomenological model of earth radiance that depends on six empirically determined parameters is developed under certain simplifying assumptions. The model incorporates path radiance and illumination from Sun and sky and their dependencies on surface altitude and orientation. It takes explicit account of surface shape, represented by a digital terrain model, and is therefore especially suited for use in mountainous terrain. A number of ways of determining the model parameters are discussed, including the use of shadows to obtain path radiance and to estimate local albedo and sky irradiance. The emphasis is on extracting as much information from the image as possible, given a digital terrain model of the imaged area and a minimum of site-specific atmospheric data. The albedo image, introduced as a representation of surface reflectance, provides a useful tool to evaluate the simple imaging model. Criteria for the subjective evaluation of albedo images are established and illustrated for LANDSAT multispectral data of a mountainous regions of Switzerland. Author (GRA)

N83-34431# Army Engineer Topographic Labs., Fort Belvoir, Va.
CONSTRUCTION OF NEW AREA SAMPLING FRAMES USING LANDSAT IMAGERY
Daniel J. Costanzo 17 Mar. 1983 10 p refs
(AD-A128806) Avail: NTIS HC A02/MF A01 CSCL 08/2

The U.S. Department of Agriculture develops Area Sampling Frames (ASF's) for each state using a series of land-use maps, and utilizes them is selecting statistical samples for agricultural surveys. Recently, LANDSAT imagery provided up-to-date land-use information during construction of a new ASF for California. Multispectral Scanner false-color scenes were manually interpreted along with aerial photos, density of cultivation. Finally, these boundaries were digitized, forming a computerized ASF data base. Use of this ASF improved statistical efficiency with reduced sample size for California agricultural surveys. Author (GRA)

N83-34432# Minnesota Geological Survey, St. Paul.
NATIONAL URANIUM RESOURCE EVALUATION: NEW ULM QUADRANGLE, MINNESOTA
D. L. Southwick, G. B. Morey, R. S. Lively, and R. J. Beltrame Jul. 1982 156 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-018988; PGJ/F-052-82) Avail: NTIS HC A08/MF A01

Uranium resources of the New Ulm Quadrangle, Minnesota, were evaluated using available surface and subsurface geologic information and newly acquired geochemical data. Surface exposures of bed rock were sampled systematically and analyzed for uranium and 30 other elements. Geochemical anomalies revealed hydrogeochemical and stream-sediment reconnaissance were followed up by additional sampling, and detailed surveys of radon and helium abundance in ground water were undertaken in three areas preselected on the basis of regional magnetic and gravity data. One uranium occurrence, previously unreported, was located during outcrop reconnaissance and sampling, and two areas of uranium favorability were delineated chiefly on geologic evidence. The favorable areas are underlain by the Sioux Quartzite of Proterozoic age, the basal unconformity of which is considered to be a favorable environment for vein-breccia uranium occurrences. DOE

N83-34433# Geological Survey, Denver, Colo. Water Resources Div.
TWO-DIMENSIONAL, STEADY-STATE MODEL OF GROUND-WATER FLOW, NEVADA TEST SITE AND VICINITY, NEVADA-CALIFORNIA
Richard K. Waddell 1982 97 p refs
(Contract DE-AI08-78ET-44802)
(DE83-009116; DOE/ET-44802/T5) Avail: NTIS HC A05/MF A01

Characteristics of the flow system are principally determined by locations of low-hydraulic-conductivity rocks (barriers); by amounts of recharge originating in the Spring Mountains, Pahranagat, Timpahute, and Sheep Ranges, and in Pahute Mesa; and by amount of flow into the study area from Gold Flat and Kawich Valley. Discharge areas (Ash Meadows, Oasis Valley, Alkali Flat, and Furnace Creek Ranch) are upgradient from barriers. Analyses of sensitivity of hydraulic head with respect to model-parameter variations indicate that the flux terms having the greatest impact on model output are recharge on Pahute Mesa, underflow from Gold Flat and Kawich Valley, and discharge at Ash Meadows. The most important transmissivity terms are those for rocks underlying the Amargosa Desert (exclusive of Amargosa Flat area), the Eleana Formation along the west side of Yucca Flat, and the Precambrian and Cambrian clastic rocks underlying the Groom Range. Sensitivities of fluxes derived from simulated heads and head sensitivities were used to determine the parameters that would most affect predictions of radionuclide transport from a hypothetical nuclear repository into the southwest quadrant of the Nevada Test Site. DOE

N83-34434# Energy Information Administration, Washington, D.C. Office of Coal, Nuclear, Electric and Alternate Fuels.
COAL PRODUCTION: 1980
May 1982 104 p
(DE83-006475; DOE/EIA-0118/80) Avail: NTIS HC A06/MF A01

US coal production and related data are reported for the year 1980, with similar data for 1979 given for comparison. The data here collected on Form EIA-7A, coal production report, from 3969 US mines that produced, processed, or prepared 10,000 or more short tons of coal in 1980. Among the items covered are production, prices, employment, productivity, stocks, and recoverable reserves. Data are reported by state, county, coal producing district, type of mining, and by type of coal (anthracite, bituminous, subbituminous, and lignite). Also included are a glossary of coal terms used, a map of the coal producing districts, and form EIA-7A with instructions. DOE

N83-34435# Rhode Island Univ., Kingston. Dept. of Geology.
PEAT RESOURCE ESTIMATION FOR RHODE ISLAND Final Report
Colen R. Peters, Jon C. Boothroyd, and William D. Hughes Oct. 1982 322 p refs Prepared for Governor's Energy Office, Providence, R.I.
(Contract DE-FG01-81FE-05108)
(DE83-005210; DOE/FE-05108/T1; TR-4-SRG) Avail: NTIS HC A14/MF A01

The objective of this study is to provide geological resource information pertinent to the fuel-potential of freshwater peat deposits in Rhode Island. Results of the study include: an estimate of Rhode Island's peat resources along with wetland maps, peat distribution and thickness maps, stratigraphic cross-section, fuel analysis of peat samples and fuel-grade peat isopach maps of 12 wetlands studied in detail. Approximately 26,640 ha or 9% of the total area in Rhode Island is comprised of freshwater wetlands and deepwater habitats. Peat in 8 of the 12 wetlands meets fuel-grade criteria and totals 1,629,030 moisture-free tons (2,506,200 air-dried tons-35% moisture). A 3 MW peat-fueled electrical generating plant would consume 13,900 tons of air-dried peat per year. The calorific value of air-dried peat is 6256 Btu/lb. An alternate application is for home heating in modified wood stoves. DOE

N83-34436# Bendix Field Engineering Corp., Grand Junction, Colo.
NATIONAL URANIUM RESOURCE EVALUATION: ARMINTO QUADRANGLE, WYOMING
J. Damp and L. Brown Jun. 1982 212 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-018994; PGJ/F-018-82) Avail: NTIS HC A10/MF A01

The Arminto Quadrangle in central Wyoming was evaluated for uranium favorability in accordance with specific criteria developed for the National Uranium Resource Evaluation program. Procedures consisted of geologic and radiometric surveying, rock and water sampling, studying well logs, and reviewing literature. Nine favorable environments were identified. Favorable environments include Cretaceous, Paleocene and Eocene sandstones of the Powder River Basin; Eocene sandstones of the Wind River Basin; the Cretaceous Cloverly Formation of the Casper Arch and Big Horn Basin; and Jurassic, Triassic, and Pennsylvania sandstones of the Mayoworth area. Additional favorable environments include solution-breccia zones in the Madison Limestone at Mayoworth; Precambrian granites at Copper Mountain for authigenic deposits; and syngenetic uraniferous phosphates in lacustrine deposits at Lysite Mountain. DOE

N83-34437# Bendix Field Engineering Corp., Grand Junction, Colo.
NATIONAL URANIUM RESOURCE EVALUATION: RITZVILLE QUADRANGLE, WASHINGTON
B. R. Fleshman and S. P. Dodd Jul. 1982 177 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-018206; PGJ/F-041-82) Avail: NTIS HC A09/MF A01

The Ritzville Quadrangle, Washington, was evaluated using criteria of the National Uranium Resource Evaluation program for identifying environments and delineating areas favorable for uranium deposits. Reconnaissance and detailed investigations included the evaluation of reported uranium occurrences, geochemical sampling, and field evaluation of aerial radiometric anomalies. Detailed investigations were conducted mainly in the northeastern corner of the quadrangle where there are two producing uranium mines, the Midnite and the Sherwood. The Midnite Mine uranium deposit is hosted by Precambrian metasedimentary rocks of the Togo Formation that are favorable for allogenic uranium deposits. Metasedimentary rocks of Paleozoic age are also favorable for allogenic deposits where they underlie a small area containing the Lowley Lease occurrence. DOE

N83-34438# Bendix Field Engineering Corp., Grand Junction, Colo.
NATIONAL URANIUM RESOURCE EVALUATION. THERMOPOLIS QUADRANGLE, WYOMING
Kathryn Kadish Hesse Jun. 1982 135 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-017078; PGJ/F-030-82) Avail: NTIS HC A07/MF A01

The Thermopolis Quadrangle of Wyoming was evaluated to define areas favorable for the occurrence of uranium deposits. Surface geologic and radiometric surveys were done in selected environments within the quadrangle. Geophysical logs, where available, were used to evaluate the subsurface. Uranium occurrences reported from the literature were investigated. Aerial radiometric data were analyzed, and followup studies of anomalies were field checked. As a result of the investigations, the upper facies of the Eocene Wind River Formation is considered favorable for sandstone uranium deposits, and the Precambrian rocks near Copper Mountain are though favorable for authigenic deposits. DOE

N83-34439# Bendix Field Engineering Corp., Grand Junction, Colo.
NATIONAL URANIUM RESOURCE EVALUATION, RENO QUADRANGLE, NEVADA AND CALIFORNIA
B. W. Hurley, C. L. Johnson, G. M. Cupp, D. L. Mayerson, P. A. Dodd, and J. C. Berg Jul. 1982 196 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-017580; PGJ/F-037-82) Avail: NTIS HC A09/MF A01

The Reno Quadrangle, Nevada and California, was evaluated using National Uranium Resource Evaluation criteria to identify and delineate areas favorable for the occurrence of uranium deposits. Investigations included reconnaissance and detailed surface geologic and radiometric studies, geochemical sampling and evaluation, analysis and ground-truth followup of aerial radiometric data, and subsurface data evaluation. The results of these investigations indicate environments favorable for Wyoming roll-type sandstone uranium deposits in the middle Tertiary basins of the Red Rock, Winnemucca, Warm Springs, Hungry, and Spanish Springs Valleys. Environments favorable for authigenic deposits are present in the porphyritic quartz monzonite of the Singatse Range. The Petersen, Seven Lakes, Dogskin, Virginia, and Pah Rah Mountains area and the southern Nightingale Mountains are favorable for hydroallogenic uranium deposits. DOE

N83-34440# Geological Survey, Laramie, Wyo.
REVIEW OF REPORTED TARSAND OCCURRENCES AND RECENT PROJECTS IN WYOMING
Michael Clark and Gary B. Glass May 1983 52 p refs
(Contract DE-AS20-82LC-10916)
(DE83-011736; DOE/LC-10916/T1; WGS-82-5) Avail: NTIS HC A04/MF A01

A synopsis is presented of 78 reported occurrences of shallow, oil impregnated rocks in Wyoming many of which may be tar sands. (Appendices A and B). In most cases, there are only sketchy descriptions of these occurrences, scattered throughout the literature. This paper is a prelude to much needed studies and evaluations of these individual deposits. In addition, brief descriptions of three recent extractive operations are presented. DOE

N83-34441# Geological Survey, Helena, Mont. Water Resources Div.
WATER RESOURCES DATA FOR MONTANA, WATER YEAR 1981. VOLUME 1: HUDSON BAY BASIN, MISSOURI RIVER BASIN Annual Water-Data Report, 1 Oct. 1980 - 30 Sep. 1981
1981 663 p
(PB83-170613; USGS/WRD/HD-82/060-Vol-1; USGS-WRD-MT-81-1-Vol-1) Avail: NTIS HC A99/MF A01 CSCL 08H

Water resources data for the 1981 water year for Montana consist of records of stage, discharge, and water quality of streams; stage, contents and water quality of lakes and reservoirs; and water levels in wells. This report contains discharge records for 177 gaging stations; stage only records for 1 lake station; stage/contents for 6 lakes and reservoirs; water quality for 116 stations; water levels for 9 observation wells. Also included are 141 crest-stage partial-record stations and 33 smaller reservoirs. GRA

N83-34442# Geological Survey, Jackson, Miss. Water Resources Div.
WATER RESOURCES DATA FOR MISSISSIPPI, WATER YEAR 1981 Annual Water-Data Report, 1 Oct. 1980 - 30 Sep. 1981
Dec. 1982 422 p Sponsored in part by the Mississippi Dept. of Natural Resources and with other state, county, municipal and federal agencies
(PB83-170746; USGS/WRD/HD-82/065; USGS-WDR-MS-81-1) Avail: NTIS HC A18/MF A01 CSCL 08H

Water resources data for the 1981 water year for Mississippi consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground water wells. Records of water discharge at 82 gaging stations; stage records for 18 of these gaging stations; stage only at 4 gaging stations; contents for 4 lakes; water quality for 33 gaging stations, and 123 wells; and water levels for 324 observation wells are included. GRA

N83-34443# Geological Survey, Orlando, Fla. Water Resources Div.
WATER RESOURCES DATA FOR FLORIDA, WATER YEAR 1981. VOLUME 1: NORTHEAST FLORIDA Annual Water-Data Report, 1 Oct. 1980 - 30 Sep. 1981
Sep. 1982 609 p Sponsored in part by the State of Florida and other agencies
(PB83-170753; USGS/WRD/HD-82/005-Vol-1;

USGS-WDR-FL-81-1-Vol-1) Avail: NTIS HC A99/MF A01 CSCL 08H

Water resources data for the 1981 water year for northeast Florida includes continuous or daily discharge for 57 streams, periodic discharge for 6 streams, miscellaneous discharge for 62 streams, peak discharge for 29 streams, low flow discharge for 2 streams, continuous or daily stage for 28 streams; continuous elevations for 20 lakes and periodic elevations for 30 lakes; continuous ground water levels for 31 wells, periodic ground water levels for 116 wells, and miscellaneous water level measurements for 636 wells; quality of water for 80 surface water sites and for 702 wells. GRA

N83-34444# Geological Survey, Boston, Mass. Water Resources Div.

WATER RESOURCES DATA FOR NEW HAMPSHIRE AND VERMONT, WATER YEAR 1981 Annual Water-Data Report, 1 Oct. 1980 - 30 Sep. 1981

Sep. 1982 178 p Sponsored in part by the States of New Hampshire and Vermont and other agencies
(PB83-170803; USGS/WRD/HD-82/067;
USGS-WDR-NH-VT-81-1) Avail: NTIS HC A09/MF A01 CSCL 08H

Water resources data for the 1981 water year for New Hampshire and Vermont consist of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels and water quality of wells. Discharge records for 75 gaging stations, stage records for 3 lakes, month end contents for 25 lakes and reservoirs, water quality data for 4 gaging stations; and water levels for 30 observation wells are given. Author (GRA)

N83-34445# Geological Survey, Cheyenne, Wyo. Water Resources Div.

WATER RESOURCES DATA FOR WYOMING, WATER YEAR 1981. VOLUME 1: MISSOURI RIVER BASIN Annual Water-Data Report, 1 Oct. 1980 - 30 Sep. 1981

Dec. 1982 588 p Sponsored in part by the State of Wyoming and other agencies
(PB83-170944; USGS/WRD/HD-82/022-Vol-1;
USGS-WRD-WY-81-1-Vol-1) Avail: NTIS HC A25/MF A01 CSCL 08H

Water resources data for the 1981 water year for Wyoming consists of records of stage, discharge, and water quality of streams; stage contents, and water quality of lakes and reservoirs; and water levels and water quality of ground water. Discharge records for 155 gaging stations; stage only for records for 1 lake; stage and contents for 11 lakes and reservoirs; water quality for 89 gaging stations, and 45 ungaged stations; and water levels for 33 observation wells are given. Author (GRA)

N83-34446# Geological Survey, Honolulu, Hawaii. Water Resources Div.

WATER RESOURCES DATA FOR HAWAII - OTHER PACIFIC AREAS WATER YEAR 1981. VOLUME 1: GUAM, NORTHERN MARIANA ISLAND, FEDERATED STATES OF MICRONESIA, PALAU ISLANDS AND AMERICAN SAMOA Annual Water-Data Report, 1 Oct. 1980 - 30 Sep. 1981

Sep. 1982 160 p Sponsored in part by the governments of Guan, Northern Mariana Island, Federated States of Micronesia, Palau Islands, American Samoa and other agencies
(PB83-171116; USGS/WRD/HD-82/062-Vol-2;
USGS-WDR-HI-81-02-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 08H

Water resources data for the 1981 water year for other Pacific areas consist of records of stage, discharge, and water quality of streams; stage of a reservoir; and water levels in wells and springs. Discharge records for 41 gaging stations; stage only record for 2 gaging stations; water quality for 3 gaging stations, 39 partial record stations; water temperature for 60 gaging stations; and water levels for 10 observation wells are given. Also included are 47 low flow partial record stations. Author (GRA)

N83-34447# Fish and Wildlife Service, Kearneysville, W. Va. Adaptive Environmental Assessment Group.

EFFECTS OF ACID PRECIPITATION ON AQUATIC RESOURCES: RESULTS OF MODELING WORKSHOPS. AIR POLLUTION AND ACID RAIN REPORT

Jul. 1982 150 p refs Sponsored in part by EPA
(PB83-141564; FWS/OBS-80/40.12; Rept-12) Avail: NTIS HC A07/MF A01 CSCL 08H

A series of Adaptive Environmental Assessment (AEA) workshops on acid precipitation, sponsored by the U.S. Fish and Wildlife Service's National Power Development Group is discussed. The priority research needed for a better understanding of the acidification process and its impacts on aquatic resources of watershed ecosystems is identified. A preliminary computer simulation model, developed through the workshop process and designed to describe and integrate the mechanisms by which acid precipitation alters stream and lake chemistry and impacts fish populations and other aquatic components, is presented. GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N83-34448* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

HIGH TEMPERATURE GLASS THERMAL CONTROL STRUCTURE AND COATING Patent

David A. Stewart (Stanford Univ.), Howard E. Goldstein (Stanford Univ.), and Daniel B. Leiser, inventors (to NASA) (Stanford Univ.) Issued 26 Apr. 1983 6 p Filed 2 Oct. 1981 Supersedes N82-10228 (20 - 01, p 0035) Sponsored by NASA
(NASA-Case-ARC-11164-1; US-Patent-4,381,333;
US-Patent-Appl-SN-308007; US-Patent-Class-428-312.6;
US-Patent-Class-350-166; US-Patent-Class-428-325;
US-Patent-Class-428-428; US-Patent-Class-428-427) Avail: US Patent and Trademark Office CSCL 10A

A high temperature stable and solar radiation stable thermal control coating is described which is useful either as such, applied directly to a member to be protected, or applied as a coating on a re-usable surface insulation (RSI). It has a base coat layer and an overlay glass layer. The base coat layer has a high emittance, and the overlay layer is formed from discrete, but sintered together glass particles to give the overlay layer a high scattering coefficient. The resulting two-layer space and thermal control coating has an absorptivity-to-emissivity ratio of less than or equal to 0.4 at room temperature, with an emittance of 0.8 at 1200 F. It is capable of exposure to either solar radiation or temperatures as high as 2000 F without significant degradation. When used as a coating on a silica substrate to give an RSI structure, the coatings of this invention show significantly less reduction in emittance after long term convective heating and less residual strain than prior art coatings for RSI structures.

Official Gazette of the U.S. Patent and Trademark Office

N83-34449* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

VARIABLE ANODIC THERMAL CONTROL COATING Patent

Charles S. Gilliland and J. Duckett, inventors (to NASA) Issued 9 Aug. 1983 8 p Filed 9 Apr. 1982 Supersedes N82-31508 (20 - 22, p 3111)
(NASA-Case-LAR-12719-1; US-Patent-4,397,716;
US-Patent-Appl-SN-367134; US-Patent-Class-204-33;
US-Patent-Class-204-35N; US-Patent-Class-126-901) Avail: US

Patent and Trademark Office CSCL 10A

A process for providing a thermal control solar stable surface coating for aluminum surfaces adapted to be exposed to solar radiation wherein selected values within the range of 0.10 to 0.72 thermal emittance (epsilon sub tau) and 0.2 to 0.4 solar absorptance (alpha subs) are reproducibly obtained by anodizing the surface area in a chromic acid solution for a selected period of time. The rate voltage and time, along with the parameters of initial epsilon sub tau and alpha subs, temperature of the chromic acid solution, acid concentration of the solution and the material anodized determines the final values of epsilon/tau sub and alpha sub S. 9 Claims, 5 Drawing Figures.

Official Gazette of the U.S. Patent and Trademark Office

N83-34450*# Michigan Univ., Ann Arbor.

PRACTICAL ASPECTS OF PHOTOVOLTAIC TECHNOLOGY, APPLICATIONS, AND COST

Louis Rosenblum Dec. 1982 249 p

(Grant NAG3-185)

(NASA-CR-168025; NAS 1.26:168025) Avail: NTIS HC A11/MF A01 CSCL 10A

Background, understanding, and computational tools needed to master the practical aspects of photovoltaic (PV) technology, application, and cost are presented. Stand alone silicon solar cell, flat plate systems in the range of 1 to 25 kWH/day output are discussed. Topics covered include: operation and performance of each of the major system components, safety, installation, operation and maintenance, and electrical loads. Application experience and trends are presented. Indices of electrical service performance are reliability, availability, and voltage control are discussed, and the known service performance of central station electric grid, diesel generator, and PV stand alone systems are compared. The PV system sizing methods are reviewed and compared, and a procedure for rapid sizing is described and illustrated by the use of several sample cases. The rapid sizing procedure yields an array and battery size that corresponds to a minimum cost system for a given load requirement, insolation condition, and desired level of service performance. The PV system capital cost and levelized energy cost are derived as functions of service performance and insolation. E.A.K.

N83-34451*# Power Technologies, Inc., Schenectady, N. Y.

CONTROL OF LARGE WIND TURBINE GENERATORS CONNECTED TO UTILITY NETWORKS Final Report

E. N. Hinrichsen May 1983 91 p refs

(Contracts DEN3-252; DE-AI01-76ET-20320)

(NASA-CR-168200; DOE/NASA/0252-1; NAS 1.26:168200; R19-83) Avail: NTIS HC A05/MF A01 CSCL 10B

This is an investigation of the control requirements for variable pitch wind turbine generators connected to electric power systems. The requirements include operation in very small as well as very large power systems. Control systems are developed for wind turbines with synchronous, induction, and doubly fed generators. Simulation results are presented. It is shown how wind turbines and power system controls can be integrated. A clear distinction is made between fast control of turbine torque, which is a peculiarity of wind turbines, and slow control of electric power, which is a traditional power system requirement. Author

N83-34452*# Aerospace Corp., El Segundo, Calif. Government Support Operations.

PHOSPHORIC ACID FUEL CELL PLATINUM USE STUDY Final Report

Herbert L. Lundblad May 1983 119 p refs

(Contract DE-AI21-80ET-17088)

(NASA-CR-168130; DOE/NASA/2701-2; NAS 1.26:168130; ATR-83(3813-08)-1ND) Avail: NTIS HC A06/MF A01 CSCL 10A

The U.S. Department of Energy is promoting the private development of phosphoric acid fuel cell (PAFC) power plants for terrestrial applications. Current PAFC technology utilizes platinum as catalysts in the power electrodes. The possibie repercussions that the platinum demand of PAFC power plant commercialization will have on the worldwide supply and price of platinum from the outset of commercialization to the year 2000 are investigated. The platinum demand of PAFC commercialization is estimated by developing forecasts of platinum use per unit of generating capacity and penetration of PAFC power plants into the electric generation market. The ability of the platinum supply market to meet future demands is gauged by assessing the size of platinum reserves and the capability of platinum producers to extract, refine and market sufficient quantities of these reserves. The size and timing of platinum price shifts induced by the added demand of PAFC commercialization are investigated by several analytical methods. Estimates of these price shifts are then used to calculate the subsequent effects on PAFC power plant capital costs. Author

N83-34453*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

SUMMARY OF SYNFUEL CHARACTERIZATION AND COMBUSTION STUDIES Final Report

Donald F. Schultz Aug. 1983 57 p refs

(Contract DE-AI01-77ET-13111)

(NASA-TM-83066; DOE/NASA/13111-15; E-1537; NAS 1.15:83066) Avail: NTIS HC A04/MF A01 CSCL 21B

Combustion component research studies aimed at evolving environmentally acceptable approaches for burning coal derived fuels for ground power applications were performed at the NASA Lewis Research Center under a program titled the "Critical Research and Support Technology Program" (CRT). The work was funded by the Department of Energy and was performed in four tasks. This report summarizes these tasks which have all been previously reported. In addition some previously unreported data from Task 4 is also presented. The first, Task 1 consisted of a literature survey aimed at determining the properties of synthetic fuels. This was followed by a computer modeling effort, Task 2, to predict the exhaust emissions resulting from burning coal liquids by various combustion techniques such as lean and rich-lean combustion. The computer predictions were then compared to the results of a flame tube rig, Task 3, in which the fuel properties were varied to simulate coal liquids. Two actual SRC 2 coal liquids were tested in this flame tube task. Author

N83-34454*# General Dynamics Corp., St. Louis, Mo. Convair Div.

ANALYSIS OF THE REFLECTIVE MULTIBANDGAP SOLAR CELL CONCEPT

T. G. Stern Jul. 1983 42 p refs

(Contract NAS3-22252)

(NASA-CR-168186; NAS 1.26:168186; GDC-SP-83-041) Avail: NTIS HC A03/MF A01 CSCL 10A

A new and unique approach to improving photovoltaic conversion efficiency, the reflective multiband gap solar cell concept, was examined. This concept uses back surface reflectors and light trapping with several physically separated cells of different bandgaps to make more effective use of energy from different portions of the solar spectrum. Preliminary tests performed under General Dynamics Independent Research and Development (IRAD) funding have demonstrated the capability for achieving in excess of 20% conversion efficiency with aluminum gallium arsenide and silicon. This study analyzed the ultimate potential for high conversion efficiency with 2, 3, 4, and 5 different bandgap materials, determined the appropriate bandgaps needed to achieve this optimized efficiency, and identified potential problems or constraints. The analysis indicated that an improvement in efficiency of better than 40% could be attained in this multibandgap approach, compared to a single bandgap converter under the same assumptions. Increased absorption loss on the back surface reflector was found to incur a minimal penalty on efficiency for two and three bandgap systems. Current models for bulk absorption losses in 3-5 materials were found to be inadequate for explaining laboratory observed transmission losses. Recommendations included the continued development of high bandgap back surface reflector cells and basic research on semiconductor absorption mechanisms. Author

N83-34455# Junta de Energia Nuclear, Madrid (Spain).
ACID PREHYDROLYSIS OF THE LIGNOCELLULOSIC BIOMASS FROM THISTLE ONOPORDUM NERVOSUM BOISS
C. Suarez, D. Paz, and A. Diaz 1983 29 p refs In SPANISH; ENGLISH summary
(JEN-547; ISSN-0081-3397) Avail: NTIS HC A03/MF A01

The acid prehydrolysis of the lignocellulosic biomass from thistle O. nervosum has been conducted to determine the conditions for maximum yield of pentoses with minimum yield of hexoses. Variables studied were acid concentration (H2SO4, 1, 3, 4 and 5%), temperature (100 C and 120 C) time, solid to liquid ratio and degree of fineness of thistle (4 to 65 mesh). Author

N83-34456*# Fairchild Weston Systems, Inc., Sarasota, Fla.
DOE/NASA WIND TURBINE DATA ACQUISITION SYSTEM. PART 4: OPERATIONS AND MAINTENANCE MANUAL (PLUM-BROOK STATION)
S. Prenger and T. Tatman Feb. 1983 96 p
(Contract C-19179-D)
(NASA-CR-168084; NAS 1.26:168084; FWS-7680-Pt-4) Avail: NTIS HC A05/MF A01 CSCL 10A

Preventive maintenance, calibration procedures, system verification, system operating procedures, systems software fundamentals, data base (program files), and patchboard layout are discussed. Author

N83-34457# Research Triangle Inst., Research Triangle Park, N.C. Semiconductor Research Dept.
DEVELOPMENT OF HIGH EFFICIENCY, STACKED MULTIPLE BANDGAP SOLAR CELLS Final Report, 1 Oct. 1979 - 31 Mar. 1982
S. M. Bedair, R. J. Markunas, J. P. C. Chiang, and J. A. Hutchby Wright-Patterson AFB, Ohio AFAPL Sep. 1982 248 p refs
(Contract F33615-78-C-2077; AF Proj. 3145)
(AD-A126588; AFAPL-TR-79-2116-Vol-2; RTI/1678/00-F-Vol-2) Avail: NTIS HC A11/MF A01 CSCL 10/2

The development of a high efficiency two function cascade solar cell suitable for space applications and the use of the AlGaAs/GaAs material system is reported. The technology developed for the LPE growth of the planar cascade structure is presented which includes doping studies, and the development of optimum growth procedures for obtaining high quality LPE layers. Ohmic contact and AR coating technologies are discussed. Experimental results are presented for individual top cells, bottom cells, connecting junctions, and for monolithic cascade structures. The experimental results are correlated with modeling results to determine the factors limiting the performance of these cells. GRA

N83-34458# Aluminum Co. of America, Alcoa Center, Pa.
DESIGN AND FABRICATION OF A LOW COST DARRIEUS VERTICAL AXIS WIND TURBINE SYSTEM: PHASE 2, VOLUME 1: EXECUTIVE SUMMARY
Mar. 1983 51 p
(Contract DE-AC04-76DP-00789)
(DE83-010218; SAND-82-7113/1) Avail: NTIS HC A04/MF A01

Described is the successful fabrication, installation, and checkout of 100 kW 17 meter Vertical Axis Wind Turbines (VAWTs). The turbines are Darrieus-type VAWTs with rotors 17 meters (55 feet) in diameter and 25.15 meters (83 feet) in height. They can produce 100 kW of electric power at a cost of energy as low as 3 cents per kWh, in an 18 mph wind regime using 12% annualized costs. Four turbines were produced; three are installed and are operable at: (1) Wind Systems Test Center, Rocky Flats, Colorado; (2) the US Department of Agriculture Conservation and Production Research Center at Bushland, Texas; and (3) Tisbury Water Authority, Vineyard Haven, Massachusetts, on the island of Martha's Vineyard. The fourth turbine is stored at Bushland, Texas awaiting selection of an erection site. DOE

N83-34459# Oak Ridge National Lab., Tenn. Engineering Technology Div.
TECHNICAL ANALYSIS OF THE USE OF BIOMASS FOR ENERGY PRODUCTION
I. Spiewak, J. P. Nichols, D. Alvic, J. G. Delene, B. H. Fitzgerald, J. R. Hightower, O. H. Klepper, J. R. Krummel, and J. B. Mills Aug. 1982 107 p refs
(Contract W-7405-eng-26)
(DE82-019854; ORNL/TM-7919) Avail: NTIS HC A06/MF A01

Results of a technical and economic evaluation of the use of biomass for energy production are presented. Estimates are made of the current and projected production and uses of biomass in the forms of wood, crop residues, grass and herbage, special crops, and animal wastes in various sectors of the US energy market. These studies indicate that because of its higher-value uses, bulkiness, diffuseness, and high water content, biomass is generally not competitive with conventional energy sources and is expected to have only limited application for energy production in the major market sectors - including the commercial sector, manufacturing, transportation, and electric utilities. The use of biomass for energy production is increasing in the forest-products industry, in farm applications, and in home heating because it is readily available to those users. DOE

N83-34460# Pacific Northwest Lab., Richland, Wash. Advanced Concepts Evaluation Sect.
TECHNICAL AND ECONOMIC ASSESSMENT OF THE USE OF AMMONIA EXPANDERS FOR ENERGY RECOVERY IN AIR-COOLED POWER PLANTS
S. G. Hauser, G. J. Hane, and B. M. Johnson Jul. 1982 46 p refs
(Contract DE-AC06-76RL-01830)
(DE82-018857; PNL-3279) Avail: NTIS HC A03/MF A01

Binary cycle power plants have been the subject of much discussion among engineers and scientists for nearly 100 years. Current economic and environmental concerns have stimulated new interest and research. Ammonia has been recommended by other studies as the leading contender for use as simply the heat rejection medium in an air-cooled power plant. This study investigates the technical feasibility and economic potential of including an expander in the heat rejection system of an air-cooled power plant. The expander would be used during certain parts of the year to increase the total output of the power plant. Five different plant locations (Miami, San Francisco, Bakersfield, Chicago, Anchorage) were investigated to show the effect which climate has on the economic potential of this ammonia bottoming cycle. The study shows that the expected energy costs for the bottoming cycle only will be less than 50 mills/kWh for any of the five plant locations. This cost assumes that an ammonia phase-change heat rejection system is already a part of the existing plant. DOE

N83-34461# Kent Associates, Lake Oswego, Oreg.
CITY OF NORTH BONNEVILLE, WASHINGTON: GEOTHERMAL EXPLORATION PRODUCTION TEST WELL Final Report
Jun. 1982 532 p refs
(Contract DE-FG07-80R-000099)
(DE83-008984; DOE/OR-00099/T1) Avail: NTIS HC A23/MF A01

Based on discussions with the City of North Bonneville, the production test well was drilled to a depth that would also explore for ground water temperatures near 130 F (54.4 C). Depth projections to a 130 F bottom hole temperature were made by assuming a constant ground water temperature rise greater than 50 C per kilometer, and by assuming that essentially homogeneous or equivalent conductive rock units would be encountered. Minimum water production requirements were not set, although the City determined that about 800 gpm would be acceptable. Larger upper casing diameters of 16 and 12 inches were installed in order to provide the future use of either a vertical turbine or submersible pump, as desired by the city. The scope of work included interpretation of well characteristics, evaluation of ground water as a geothermal resource, geologic analysis of data from drilling and testing, drilling supervision, daily drilling cost accounting, and preparation of a final report. The report includes geologic evaluation of the drilling and test data, ground water and geothermal potential. DOE

N83-34462# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.
RESEARCH ACTIVITIES ON FLYWHEEL ENERGY STORAGE IN THE FRAME OF THE FIRST FINALIZED ENERGY PROGRAM OF THE NATIONAL RESEARCH COUNCIL
Paolo Alia 1983 26 p Presented at 2nd European Symp. on Flywheel Energy Storage, Turin, 9-13 May 1983; sponsored by Politechnico di Milano, and CNR
(CISE-2028) Avail: NTIS HC A03/MF A01

Kinetic energy storage by flywheels, and design and construction of a prototype flywheel storage station in order to achieve the leveling of the diagram of the electric power required by industrial users are discussed. Results show that the exploitation of flywheels is viable. Author (ESA)

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N83-34463# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
ATLANTIC COAST UNIQUE REGIONAL ATMOSPHERIC TRACER EXPERIMENT (ACURATE) Interim Report
James F. Schubert, Jerome L. Heffter (NOAA, Rockville, Md.), and G. Alvin Mead (Airco, Inc.) May 1983 16 p refs
(Contract DE-AC09-76SR-00001)
(DE83-013424; DP-1651) Avail: NTIS HC A02/MF A01

The Atlantic Coast Unique Regional Atmospheric Tracer Experiment (ACURATE) is a program designed to obtain data necessary to evaluate atmospheric transport and diffusion models used to calculate regional population doses caused by nuclear facility emissions to the atmosphere. This experiment will significantly improve the basis for evaluating the cost effectiveness of different methods of managing airborne nuclear wastes. During the period from March 1982 through September 1982, twice daily air samples have been collected at each of five sampling stations located on a radial from the SRP to Murray Hill, NJ (1000 km). Kr-85 emitted from the F and H area chemical separation facilities is being used as a tracer to determine the transport and diffusion of atmospheric releases from the SRP. The Kr-85 concentrations in the air samples will be compared with the calculated concentrations as predicted by the transport and diffusion models. The Kr-85 data and the meteorological data are being archived and will be made available to the modeling community. The ACURATE program will continue through September 1983. Author

N83-34464# Rockwell International Corp., Golden, Colo. Energy Systems Group.
PROCESS FOR TREATING NITROGEN OXIDES IN EXHAUST GASES
Takuro Kodera, Minoru Ozasa, and Takano Takano Jan. 1983 7 p Transl. into ENGLISH from Japanese Kokai Patent Publ. no. SHO 51-44558, 1976 7 p
(Contract DE-AC04-76DP-03533)
(DE83-005568; RPF-TRANS-361) Avail: NTIS HC A02/MF A01

A process is described for treating nitrogen oxides in exhaust gases. It is characterized by the fact that the exhaust gases maintained at 200 to 500 C are first passed through an oxidation column packed with a spinel-type ferrite catalyst to oxidize NO and part of the NO/sub x/ present in the exhaust gases to NO2. Then they are passed through an absorption column containing a porous filler, whereupon the NOx containing the NO2 are absorved by an aqueous alkaline solution and removed. DOE

N83-34465# Butler Univ., Indianapolis, Ind. Research Inst.
TROPICAL ORGANIC SOILS ECOSYSTEMS IN RELATION TO REGIONAL WATER RESOURCES IN SOUTHEAST ASIA
Thomas V. Armentano 1982 18 p refs Presented at the Workshop on Limnology and Water Resources Management in Developing Countries of Asia and the Pacific, Kuala Lumpur, Malaysia, 29 Nov. - 5 Dec. 1982
(Contract DE-AC02-81EV-10725)
(DE83-000994; CONF-821118-1; DOE/ER-10725/3) Avail: NTIS HC A02/MF A01

Tropical organic soils functioned as natural sinks for carbon, nitrogen, sulfur and other nutrients for the past 4000 years or more are discussed. Topographic evolution in peat swamp forests towards greater oligotrophy has concentrated storage of the limited nutrient stock in surface soils and biota. Tropical peat systems thus share common ecosystem characteristics with northern peat bogs and certain tropical oligotrophic forests. Organic matter accumulation and high cation-exchange-capacity limit nutrient exports from undisturbed organic soils, although nutrient retention declines with increasing eutrophy and wetland productivity. Peat swamps are subject to irreversible degradation if severely altered because disturbance of vegetation, surface peats and detritus can disrupt nutrient cycles and reduce forest recovery capacity. Drainage also greatly increases exports of nitrogen, phosphorus and other nutrients and leads to downstream eutrophication and water quality degradation. Regional planning for clean water supplies must recognize the benefits provided by natural peatlands in balancing water supplies and regulating water chemistry. DOE

N83-34466# National Audobon Society, New York, N.Y.
SIDE EFFECTS OF RENEWABLE ENERGY SOURCES
Larry Medsker Dec. 1982 75 p refs Revised Sponsored in part by NSF
(DE83-900852; NAS/EPRD-15) Avail: NTIS HC A04/MF A01

Using preselected criteria and guidelines, a number of side effects were identified, and qualitative descriptions were compiled along with a bibliography of recent references for nine major renewable sources of energy. Various stresses, potential consequences, and possible mitigating factors are tabulated as the initial step toward establishing a SERES data base that will include for each type of renewable energy: environmental stresses organized by category; ecological consequences; possible mitigating factors and actions; and other data that can be used as input to models for projecting trends and for various calculations related to environmental side effects. This data base will be updated periodically. DOE

N83-34467# Oak Ridge National Lab., Tenn. Industrial Safety and Applied Health Physics Div.
ASBESTOS REMOVAL AND DISPOSAL INFORMATION SYSTEM: A USER'S GUIDE
P. S. Knight and B. M. Eisenhower Oct. 1982 49 p
(Contract W-7405-eng-26)
(DE83-001704; ORNL/TM-8476) Avail: NTIS HC A03/MF A01

Program ASBS01, written for the staff of the Department of Environmental Management (DEM) at Oak Ridge National Laboratory (ORNL), is an on-line management information system that provides file maintenance and information retrievability for demolition and/on renovation operations involving friable (capable of becoming an airborne health hazard) asbestos materials at the Laboratory. System 1022 is the data base management system used. The screen processor SCOPE provides the DEW staff with system prompts for ease of use and data integrity. The operation of the computer program ASBS01 from data entry to generation of totals is described. Each data attribute of the master file ASBSTO.DMS is described in detail, and a sample session is given for user reference. DOE

N83-34468# California Univ., Livermore. Lawrence Livermore Lab.
RADIATIVE EFFECTS OF A CO/SUB 2 INCREASE: RESULTS OF A MODEL COMPARISON
Frederick M. Luther 7 Oct. 1982 17 p refs Presented at the CO/sub 2 Res. Conf., Berkeley Springs, W. Va., 19-23 Sep. 1982
(Contract W-7405-eng-48)
(DE83-001776; UCRL-88121; CONF-820970-2) Avail: NTIS HC A02/MF A01

A comparison of infrared radiative transfer models is announced. The initial phase is underway, with other phases scheduled through 1984. The results of the ir model comparison

will be included in the state-of-the art report on climate modeling. Although the time scale for completion of the comparison is a few years, significant preliminary results have already been obtained. DOE

N83-34469# Hagler, Bailly and Co., Washington, D.C.
THE INDUSTRIAL MARKET FOR SULFUR DIOXIDE EMISSION-CONTROL SYSTEMS Final Report
Aug. 1982 155 p refs Prepared for Science Applications, Inc., McLean, Va.
(Contract DE-AC21-80MC-14729)
(DE83-002440; DOE/MC-14729/1243) Avail: NTIS HC A08/MF A01

Under the postulated EIA medium world oil price scenario, in which oil prices are projected to rise at a real rate of 2.2% per year, coal will represent from 78 to 91% of MFBI fuel consumption by the year 2000, up from the present 16%. This increase would occur even in the absence of FUA, because the cost of coal is substantially lower than the cost of oil or gas. Much of this market will develop in the relatively near to intermediate term (before 1990). Annual installations will be much lower (by about 40%) after that period, reflecting a lower overall steam demand growth rate and the fact that much of the discretionary conversion of gas and oil boilers to coal will have been completed. About 22% of the sales will be for discretionary conversion of oil and gas boilers still having some useful life; the rest will be for nondiscretionary expansion or replacement of worn-out boilers. DOE

N83-34470# Battelle Columbus Labs., Ohio.
UTILIZATION OF BATTELLE-TREATED COAL IN GASIFICATION AND COMBUSTION PROCESSES TO CONTROL SULFUR EMISSIONS Final Report
H. N. Conkle, H. F. Feldmann, A. Levy, E. L. Merryman, D. R. Hopper, and O. J. Hahn (Kentucky Univ.) 14 Sep. 1982 141 p refs
(Contract W-7405-eng-92-111)
(DE82-021159; BMI-2096) Avail: NTIS HC A07/MF A01

An evaluation is given of the environmental and associated economic advantages of using a coal treated by a process developed by Battelle as a feedstock for: a new partial oxidation/combustion process; commercially available fixed-bed gasifiers; and utility combustors. Findings confirm the technical and economic feasibility of using Battelle Treated Coal (BTC) in at least the first two applications. For conventional pulverized combustors, temperatures are too high to allow compliance capture of sulfur at reasonable Ca/S ratios. The program consisted of experiments to investigate the potential performance of the BTC in these applications, and an economic feasibility study of BTC utilization. An important advantage to small users is that the use of BTC eliminates the environmental problems associated with the treatment and disposal of sludges and waste water generated from flue-gas and fuel-gas desulfurization. DOE

N83-34471# Engineering-Science, Inc., Atlanta, Ga.
PROCESS MODIFICATIONS AND WASTE-MANAGEMENT PRACTICES AFFECTING DISPOSAL, UTILIZATION, AND RECOVERY OF COAL-COMBUSTION WASTES
Oct. 1982 243 p refs Prepared in cooperation with Webster and Associates, Norristown, Pa.
(Contract DE-AC01-79ET-13543)
(DE83-001840; DOE/ET-13543/T2) Avail: NTIS HC A11/MF A01

This topical report summarizes modifications and practices affecting disposal, utilization and recovery of coal combustion wastes under RCRA regulations. The primary concern of the power industry is the quantity and characteristics of ash and sludge to be disposed in the future and the potential of their being declared hazardous under RCRA and related legislation. To address the wide range of modifications and practices available to the utility industry, it was necessary to organize this report into five major groupings as follows: coal cleaning; selected power plant modifications; utilization options; scrubber sludge stabilization/fixation; and resource recovery options. This report is not intended to provide a complete technical assessment of the modifications and practices explored; rather it concentrates on: waste disposal cost of the practices employed; energy impacts; regulatory problems; and handling properties or hazard potential. The contents of this topical report are based on literature reviews, data reviews and selected personal contacts. DOE

N83-34472# North Carolina State Univ., Raleigh. Dept. of Chemical Engineering.
POLLUTANTS FROM COAL-CONVERSION PROCESSES Progress Report, 1 Jun. - 31 Aug. 1982
J. K. Ferrell and R. M. Felder 1982 36 p refs
(Grant DE-FG22-80PC-30232)
(DE83-000584; DOE/PC-30232/T4; PR-4) Avail: NTIS HC A03/MF A01

A New Mexico subbituminous coal and a North Carolina peat were gasified in a pilot-scale fluidized bed reactor, and the gases were subjected to various cleaning operations. All gaseous and condensed-phase effluent streams in the plant were analyzed, and potentially hazardous species in these streams were identified and quantified. The results are summarized. DOE

N83-34473# Pacific Northwest Lab., Richland, Wash.
COMPUTING TRANSIENT INDOOR AIR QUALITY
K. J. Allwine and P. C. Owczarski Apr. 1982 7 p refs Presented at National Conf. on Environ. Engr., Minneapolis, 14 Jul. 1982
(Contract DE-AC06-76RL-01830)
(DE82-018849; PNL-SA-10038; CONF-820723-2) Avail: NTIS HC A02/MF A01

Transient levels of indoor pollutants are modeled using the CORRAL Code. A single family dwelling is the location of various scenarios that illustrate the use of the code and the effects of factors causing transient conditions. The variable factors studied are atmospheric conditions (wind speed and direction and outdoor temperatures and pollution levels) as well as source terms and particle sizes. Variable infiltration rates and flow directions within the welling can lead to significant errors in calculated indoor air quality. DOE

N83-34474# Pacific Northwest Lab., Richland, Wash.
RESIDENTIAL WEATHERIZATION-INDOOR AIR POLLUTION
Graham B. Parker, Peter C. Owczarski, and William F. Sandusky Apr. 1982 8 p refs Presented at the Natl. Conf. on Environ. Eng., Minneapolis, 14-16 Jul. 1982
(Contract DE-AC06-76RL-01830)
(DE82-018850; PNL-SA-10020; CONF-820723-1) Avail: NTIS HC A02/MF A01

The important factors to be considered in determining indoor air pollution concentrations in residences are described. Predictions of indoor air pollution concentrations and their impacts on human health and the environment were made in an Environmental Impact Statement (EIS) written for a residential weatherization program. This program is designed to reduce energy consumption by reducing the air-infiltration (air-exchange rate), by offering air infiltration reduction measures to eligible electrically-heated residences. Indoor air pollutant concentrations are predicted in four residence types: single family attached (i.e., duplexes, fourplexes), single family detached, mobile homes, and apartments). The pollutants addressed are: radon, formaldehyde, carbon monoxide, carbon dioxide, oxides of nitrogen, respirable particulates, and benzo-(a)-pyrene. The major sources of each pollutant in a residence are given. DOE

N83-34475# Automation Industries, Inc., Silver Spring, Md.
ENVIRONMENTAL DATA FOR SITES IN THE NATIONAL SOLAR DATA NETWORK, JUNE 1982
Jun. 1982 105 p refs
(Contract DE-AC01-79CS-30027)
(DE82-019028; SOLAR/0010-82/06) Avail: NTIS HC A06/MF A01

Environmental information collected at the sites of the National Solar Data Network is presented in the form of tables for each solar site. The sites are grouped into 12 zones, each of which

consists of several adjacent states. The insolation table presents the total, diffuse, direct, maximum, and extraterrestrial radiation for the solar site. It also shows the ratio of total to extraterrestrial radiation as a percent. The temperature table gives the average, daytime, nighttime, maximum, minimum, and inlet-water temperatures for the solar site. All of the passive and some of the active solar sites are equipped with wind sensors which provide information for two wind tables furnishing wind speed and direction. For some sites, a humidity table provides relative humidity values for day and night. It also gives values for the maximum and minimum humidity for each day. A technology discussion of the instruments and measurements used to obtain these data tables is included. DOE

N83-34476# Vitro Labs., Silver Spring, Md.
ENVIRONMENTAL DATA FOR SITES IN THE NATIONAL SOLAR DATA NETWORK
Apr. 1982 127 p
(Contract DE-AC01-79CS-30027)
(DE82-015995; SOLAR/0010-82/04) Avail: NTIS HC A07/MF A01

Environmental information collected at the sites of the National Solar Data Network is presented in the form of tables for each solar site. The sites are grouped into 12 zones, each of which consists of several adjacent states. The insolation table presents the total, diffuse, direct, maximum, and extraterrestrial radiation for the solar site. It also shows the ratio of total to extraterrestrial radiation as a percent. The temperature tables gives the average, daytime nighttime, maximum, minimum and inlet-water temperatures for the solar site. All of the passive and some of the active solar sites are equipped with wind sensors which provide information for two wind tables furnishing wind speed and direction. For some sites, a humidity tables provides relative humidity values for the maximum and minimum humidity for each day. A technical discussion of the instruments and measurements used to obtain these data tables is included. DOE

N83-34477# Oak Ridge National Lab., Tenn. Environmental Sciences Div.
INTERACTIVE EFFECTS OF ACID RAIN AND GASEOUS AIR POLLUTANTS ON NATURAL TERRESTRIAL VEGETATION
S. B. McLaughlin, C. F. Baes, III, R. K. McConathy, L. L. Sigal, and R. F. Walker 1983 12 p refs Presented at the Acid Rain Program Rev. Meeting, Raleigh, N.C., 21 Feb. 1983
(Contract W-7405-eng-26)
(DE83-007507; CONF-830216-2) Avail: NTIS HC A02/MF A01

Accumulation patterns of trace elements which differ widely between elements and between tree species were investigated. Many elements show patterns of increasing concentration in recent tissues with some elements such as zinc and chromium showing steady increases over the past 30 years. Highest levels of aluminum, zinc, copper, and chromium occur in most recent tissues of shortleaf pine and are at levels of potential concern for adverse effects to metabolically active tissues. DOE

N83-34478# Sandia Labs., Albuquerque, N. Mex.
UNITED STATES DEPARTMENT OF ENERGY SEWAGE SLUDGE IRRADIATION PROJECT
J. Gary Yeager and William H. McMullen (DOE, Albuquerque, New Mex.) 1982 20 p refs Presented at Arizona Water Pollution Control Assoc. Conf., Flagstaff, Ariz., 5-7 May 1982
(Contract DE-AC04-76DP-00789)
(DE82-016722; SAND-82-0948C; CONF-820584-1) Avail: NTIS HC A02/MF A01

The mission of the United States Department of Energy Beneficial Uses of Nuclear By-products Program is to identify and encourage the development of technology that uses radioactive by-products from US defense nuclear programs to provide alternative solutions to major national problems. A major project in the Beneficial Uses Program is the Sewage Sludge Irradiation Project. The technology for this project was developed at Sandia National Laboratories and uses the radioactive byproduct cesium-137 to reduce pathogenic microorganisms in sewage sludge to levels where reuse of the sludge product in public areas meets current regulatory criteria for protection of the public health. A large-scale pilot plant is currently in operation and full-scale demonstrations of the technology are also planned. DOE

N83-34479# Karlsruhe Univ. (West Germany).
ACCOUNTING FOR MOISTURE EFFECTS IN THE PREDICTION OF BUOYANT PLUMES
M. Schatzmann and A. J. Policastro (Argonne National Lab., Ill.) 1981 15 p refs Presented at 12th NATO/CCMS Intern. Tech. Meeting on Air Pollution Modeling and its Appl., Menlo Park, Calif., 25 Aug. 1981
(Contract W-31-109-eng-38)
(DE83-009043; CONF-810841-5) Avail: NTIS HC A02/MF A01

In this paper, the theory of plume rise from stacks with scrubbers is critically evaluated. The significant moisture content of the scrubbed plume upon exit leads to important thermodynamic effects during plume rise which are unaccounted for in the usual dry plume rise theories. For example, under conditionally unstable atmospheres, a wet scrubbed plume treated as completely dry acts as if the atmosphere were stable whereas in reality, the scrubbed plume behaves instead as if the atmosphere were unstable. Even the use of moist plume models developed for application to cooling tower plume rise are not valid since these models employ (1) the Boussinesq approximation, (2) use a number of additional simplifying approximations which require small exit temperature differences between tower exit and ambient, and (3) are not calibrated to stack data. Although these two theories are often used to predict plume rise from stacks with scrubbers, both theories contain unacceptable assumptions. DOE

N83-34480# Argonne National Lab., Ill. Chemical Technology Div.
OXYGEN-18 ESTIMATION OF PRIMARY SULFATE IN TOTAL SULFATE SCAVENGED BY RAIN FROM A POWER-PLANT PLUME
Ben D. Holt, Eugene Nielsen, and Romesh Kumar 1982 12 p refs Presented at the 4th Intern. Conf. on Precipitation Scavenging, Dry Deposition and Resuspension, Santa Monica, Calif. 29 Nov. 1982
(Contract W-31-109-eng-38)
(DE83-008868; CONF-821136-21) Avail: NTIS HC A02/MF A01

The use of an oxygen isotope technique for determining the relative amounts of primary and secondary sulfates in atmospheric sulfates is proposed. The application of this technique to the estimation of the relative amounts primary sulfates and SO2 scavenged from the plume of a large power plant by summer rains is described. Results are given for the percent primary sulfate calculated for the sulfates scavenged by rain in the precipitation events that were not disqualified by the three imposed constraints. The average is 48%; the corresponding averages for background rain and rain at test sites for the same events were 24% and 37%, respectively. These results imply that about 48% of the scavenged sulfates originated in the power generating units as SO2 which subsequently hydrolized with water vapor in the flue gas to form particulate sulfate. The other 52% originated as SO2 which oxidized in the plume rain system to form the secondary sulfates later found in the collected sample of rainwater. DOE

N83-34481# Argonne National Lab., Ill. Radiological and Environmental Research Div.
CASE STUDY OF AEROSOL SIZE DISTRIBUTION AND CHEMISTRY DURING PASSAGES OF A COLD AND A WARM FRONT
C.-M. Sheih, S. A. Johnson, and F. T. DePaul 1982 10 p refs Presented at the 4th Intern. Conf. On Precipitation Scavenging, Dry Deposition and Resuspension, Santa Monica, Calif., 29 Nov. 1982
(Contract W-31-109-eng-38)
(DE83-008873; CONF-821136-22) Avail: NTIS HC A02/MF A01

Studies of precipitation scavenging as a sink for atmospheric pollutants were propelled further by recent concern over acid rain, which led to an extensive multilaboratory study known as Oxidation

and Scavenging Characterization of April Ram (OSCAR) conducted over an area near Fort Wayne, Indiana. As part of the OSCAR study, the results of the field measurements of the size distribution and chemistry of atmospheric aerosols centered around two separate periods of rain during passages of cold and warm fronts are reported. Results of the study of atmospheric aerosol in a rural area indicate that the prerain volume concentration of aerosol size distribution is generally bimodal peaking, at about 0.7 microns for the fine mode and 7 to 10 microns for the coarse mode. The saddle point between the two modes occurs at 1.5 to 2 microns. Precipitation scavenging appears to remove effectively coarse (larger than 1.5 microns) aerosols. DOE

N83-34482# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
SCREENING AIR SAMPLES FOR POLYNUCLEAR AROMATIC COMPOUNDS: A FIELD STUDY
T. Vo-Dinh, T. B. Bruewer, R. H. Jungers (EPA, Research Triangle Park, N.C.), and T. J. Wagner (PEDCo Environmental, Inc.) 1983 12 p refs Presented at the APCA Spec. Meeting on Meas. and Monitoring of Non-Criteria Toxic Contaminants, Chicago, 22 Mar. 1983
(Contract W-7405-eng-26)
(DE83-009786; CONF-830338-1) Avail: NTIS HC A02/MF A01

The use of simple and cost-effective luminescence techniques for screening air-particulate samples is described. Two analytical methods, synchronous luminescence and room-temperature phosphorescence, are employed to monitor the content of polynuclear aromatic species in air particulate extracts collected at a woodburning community. The validity and efficacy of this cost-effective screening approach are demonstrated via comparison of the screening data with results obtained by detailed gas-chromatography/mass-spectrometry analysis. DOE

N83-34483# Stockholm Univ. (Sweden). Arrhenius Lab.
AN INVESTIGATION OF POSSIBLE SITES FOR A BACKGROUND MONITORING STATION IN THE EUROPEAN ARCTIC
Jost Heintzenberg, Walter Bischof, Sven-Aake Odn, and Berit Moberg 20 May 1983 85 p refs Sponsored by Norsk Inst. for Kuftforskning, Norsk Polarinst., Norsk Meteolologisk Inst., Inst. fuer Meteorologie, Mainz, West Germany and Kaernfysikaliska Institutionen, Lund, Sweden
(Contracts SWED-EPB-Dnr-500-788-80-F†; SWEDSRC-Dnr-E-4621-102)
(AP-22; ISSN-0280-4441) Avail: NTIS HC A05/MF A01

Sites for an air pollution monitoring station were investigated in Scandinavia, Greenland, Jan Mayen, Bear Island and in the Svalbard archipelagos. Meteorological and logistic information was gathered for each site. Air chemistry results at three of the sites were analyzed together with air mass trajectory data. At Ny-Alesund, Spitsbergen, and on Bear Island one year time series of aerosol and CO2 grab samples were collected. Two intensive air chemistry campaigns were conducted at Ny-Alesund in late winter and in summer. A site near Ny-Alesund is recommended.
Author (ESA)

N83-34082# Kyushu Univ., Fukuoka (Japan). Dept. of Chemical Engineering.
DENITRIFICATION RATE IN THE SEDIMENTS OF A HIGHLY EUTROPHIC LAKE
Mitsutoshi Nakajima, Hajime Nishimura (Tokyo Univ.), and Teruyoshi Hayamizu (Tokyo Univ.) *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 133-139 refs (For primary document see N83-34075 22-31)
Avail: NTIS HC A07/MF A01

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N83-34484 Iowa Univ., Iowa City.
ELECTROSTATIC BURSTS GENERATED BY ELECTRONS TRAPPED IN WHISTLER MODE CHORUS WAVE FIELDS Ph.D. Thesis
Lee Allen Reinleitner 1982 139 p
Avail: Univ. Microfilms Order No. DA8229965

Recent studies of wideband plasma wave data from the ISEE-1 and ISEE-2 spacecraft have revealed that whistler mode chorus emissions in the Earth's outer magnetosphere are often accompanied by high frequency bursts of electrostatic waves with a frequency below the electron plasma frequency. Investigations have shown that in some cases the electrostatic waves are found to be modulated at the chorus frequency. Further studies indicate through use of LEPEDEA data on ISEE-1 that there bursts are being produced by a beam of electrons trapped in Landau (longitudinal) resonance in effective potential wells of the chorus wave and thus moving at the chorus phase velocity. The high frequency electrostatic waves apear to be caused by a type of two-steam instability called the resistive-medium instability, produced by these trapped electrons. Several cases are examined which suggest the relevance of these electrostatic bursts to features observed in space physical data for regions other than the Earth's magnetosphere. Dissert. Abstr.

N83-34485 California Univ., Davis.
LARGE SCALE TRANSPORT OF FINE SULFUR PARTICLES IN THE INTERMONTANE UNITED STATES Ph.D. Thesis
Lowell Lincoln Ashbaugh 1982 261 p
Avail: Univ. Microfilms Order No. DA8227857

This research was undertaken to study the patterns and modes of transport of fine sulfur particles in the western United States. Particles were collected in two size ranges using stacked filter samplers at 40 remote sampling sites in Montana, North and South Dakota. Wyoming, Utah, Colorado, Arizona, and New Mexico. Meteorological data were obtained from the National Climatic Center. Two three-day samples were collected each week for two years. Eulerian transort fields were determined by combining the measured concenrations with the meteorological data. An empirical orthogonal function analysis was carried out to determine spatial patterns in the sulfur variability. A statistical Lagrangian trajectory analysis was carried out usng 1980 data to determine surce regions for clean and polluted air arriving at two sites. Finally, a preliminary diffusion model calculation was made to test the theory against measured concentrations. Maps of sulfur concentrations, wind fields, and mean and synoptic scale eddy transport fields are presented for several averaging periods. Dissert. Abstr.

N83-34486 State Univ. of New York, Albany.
A SPECTRAL STUDY OF SUPERCRITICAL BAROCLINIC DISTURBANCES IN A STRATIFIED VISCOUS FLUID Ph.D. Thesis
Melinda S. Peng 1982 158 p
Avail: Univ. Microfilms Order No. DA8300752

Fourier spectral analysis is applied to the study of supercritical baroclinic disturbances in the context of the Eady model (1949) in the presence of dissipation due to Ekman suction at the upper and lower boundaries. The time evolution of the disturbance amplitude in a four-parameter space is obtained by an explicit finite difference scheme of numerical integration. The numerical results obtained here compare favorably with the weakly nonlinear theory as well as with the highly nonlinear theory with small stratification. In time, the amplitudes of the disturbances either reach a steady state or exhibit a perpetual vacillation. Primary parameters determining the occurrence of vacillation are the stratification S and the zonal scale of the wave k. The upper bound for vacillation is S = 0.1. With S approx. 0.1, vacillation is

obtained only for wave scales near the minimum critical shear. As the stratification decreases, the vacillation wave scale range extends towards the Eady limit. When S approx. 0.01, vacillation is possible only near the Eady limit. Dissert. Abstr.

N83-34487# Institute of Geological Sciences, Edinburgh (Scotland). Geomagnetism Unit.
MAGNETIC RESULTS 1981: ESKDALEMUIR, HARTLAND AND LERWICK OBSERVATORIES
1983 72 p refs
(Bull-14; ISBN-0-11-884345-1) Copyright. Avail: Issuing Activity
Horizontal intensity, vertical intensity, and declination West are tabulated for three observatories. N.W.

N83-34488 Institut d'Aeronomie Spatiale de Belgique, Brussels.
MODELING OF STRATOSPHERIC IONS: A FIRST ATTEMPT
G. Brasseur and A. Chatel 1983 44 p refs Presented at 9th Ann. Meeting of the European Geophys. Soc. Leeds, Great Britain, Aug. 1982 Submitted for publication
(Aeronomica-Acta-A-261-1983) Avail: Issuing Activity
An algebraic model of stratospheric ion species is presented: AX = B, where X is a column vector representing the concentration values Xj (j = 1 to N, where N is the number of species); B with elements bi (i = 1 to N) represents the external sources of ionization; and A is an N X N square matrix whose elements aij take into account all chemical processes. Factors which represent the inverse of the time constant associated with the reaction from ion j to ion i are a function of the chemical rate constants and of neutral species concentration. For positive charges the model considers 25 different species and 44 chemical reactions; for negative charges 38 species and 134 reactions. Author (ESA)

N83-34489 Institut d'Aeronomie Spatiale de Belgique, Brussels.
OZONE PROFILE INTERCOMPARISON BASED ON SIMULTANEOUS OBSERVATION BETWEEN 20 AND 40 KM
P. Aimedieu (CNRS), A. J. Krueger (NASA), D. E. Robbins (NASA) Space Center, Houston), and P. C. Simon 1983 27 p refs Submitted for publication
(Aeronomica-Acta-A-262-1983) Avail: Issuing Activity
The vertical distribution of stratospheric ozone was simultaneously measured by five different instruments carried on the same balloon payload. Vertical profiles were also deduced from electrochemical concentration cell sondes launched from the same location by small balloons and from short Umkehr measurements made at another location. Systematic differences of the order of 20% between ozone profiles deduced from solar UV absorption and in situ techniques are found. Author (ESA)

N83-34490 Institut d'Aeronomie Spatiale de Belgique, Brussels.
THE INTERPRETATION OF ATS 6 PROTON AND ELECTRON OBSERVATIONS WITHIN THE FRAME OF THE E3H ELECTRIC FIELD MODEL
J. Lemaire 1983 24 p refs Submitted for publication
(Aeronomica-Acta-A-264-1983) Avail: Issuing Activity
It is shown that the E3H model fits well with measurements made in the equatorial region of the magnetosphere by ATS 6 during an extended period of time when the geomagnetic activity index (Kp) ranged between 1 and 2. This confirmation validates the E3H model, at least for such extended periods of time when Kp = 1 and 2+. Dynamical spectrograms of ATS 6 provide evidence for patchy or localized injection of a magnetosheath plasma cloud across the late afternoon local time sector of magnetopause. Author (ESA)

N83-34491 Institut d'Aeronomie Spatiale de Belgique, Brussels.
FIELD ALIGNED CURRENT DENSITY VERSUS ELECTRIC POTENTIAL CHARACTERISTICS FOR MAGNETOSPHERIC FLUX TUBES
J. Lemaire and M. Scherer 1983 26 p refs Presented at IAGA Symp. on Polar Cusp and Magnetosphere Boundary Layers, Edinburgh, 3-15 Aug. 1981 Submitted for publication
(Aeronomica-Acta-A-265-1983) Avail: Issuing Activity
The field aligned current density (J), a nonlinear function of the applied potential difference (phi) between the ionosphere and the magnetosphere, was calculated for plasma boundary conditions typical in a dayside cusp magnetic flux tube. The J-phi characteristic of such a flux tube changes when the temperatures of the warm magnetospheric electrons and of the cold ionospheric electrons are modified. It also changes when the relative density of the warm plasma is modified. The presence of trapped secondary electrons influences the J-phi characteristic. The partial currents contributed by the warm and cold electrons, and by warm and cold ions are illustrated. The resistive ionosphere, the return current region, and the region of particle precipitation are discussed. Author (ESA)

N83-34492 Institut d'Aeronomie Spatiale de Belgique, Brussels.
ON A NEW FLUCTUATION-DISSIPATION THEOREM IN CLIMATE DYNAMICS
C. Nicolis 1983 31 p refs Submitted for publication
(Contract EEC-CLI-027-B(G))
Avail: Issuing Activity
Physical constraints suggested by the statistical theory of irreversible processes were incorporated into the description of fluctuations in climate dynamics by applying a fluctuation-dissipation relation to the random forces in the deterministic balance equations. Zonally averaged energy balance models were analyzed. It is shown that when a Legendre expansion of the noise and temperature field is performed there is no random force associated with the equation for the globally averaged surface temperature. The effective noise active on the equation for the globally averaged surface temperature (T) is an Ornstein-Uhlenbeck rather than a Gaussian white noise. As a result, T is a nonMarkovian process. A transition in the climatic system in the form of bifurcation of new branches of solutions is reflected by the emergence of persistent, high amplitude correlations. Author (ESA)

N83-34493*# Stanford Univ., Calif. Radioscience Lab.
NONLINEAR LONGITUDINAL RESONANCE INTERACTION OF ENERGETIC CHARGED PARTICLES AND VLF WAVES IN THE MAGNETOSPHERE
Slobodan Tkalcevic May 1982 201 p refs
(Grants NGL-05-020-008; NSF DPP-80-22282; NSF DPP-80-22540; NSF ATM-80-18248)
(NASA-CR-172956; NAS 1.26:172956; TR-E4-2311) Avail: NTIS HC A10/MF A01 CSCL 04A
The longitudinal resonance of waves and energetic electrons in the Earth's magnetosphere, and the possible role this resonance may play in generating various magnetospheric phenomena are studied. The derivation of time-averaged nonlinear equations of motion for energetic particles longitudinally resonant with a whistler mode wave propagating with nonzero wave normal is considered. It is shown that the wave magnetic forces can be neglected at lower particle pitch angles, while they become equal to or larger than the wave electric forces for alpha > 20 deg. The time-averaged equations of motion were used in test particle simulation which were done for a wide range of wave amplitudes, wave normals, particle pitch angles, particle parallel velocities, and in an inhomogeneous medium such as the magnetosphere. It was found that there are two classes of particles, trapped and untrapped, and that the scattering and energy exchange for those two groups exhibit significantly different behavior. S.L.

N83-34494*# Illinois Univ., Urbana. Aeronomy Lab.
AN INVESTIGATION OF TURBULENT SCATTER FROM THE MESOSPHERE AS OBSERVED BY COHERENT-SCATTER RADAR
K. P. Gibbs and S. A. Bowhill 1 Apr. 1983 248 p refs
(Grants NsG-7506; NSF ATM-78-21765; NSF ATM-81-20371)
(NASA-CR-173001; NAS 1.26:173001; UILU-ENG-83-2502; AR-110; ISSN-0568-0581) Avail: NTIS HC A11/MF A01 CSCL 04A
Turbulent scatter from he mesosphere is observed using the Urbana coherent-scatter radar. The variation in signal-to-noise ratio as a function of time-of-day is examined. The origin of scattering regions is investigated by comparing the variations in scattered

power and Doppler velocity. Nighttime echoes are shown for periods of enhanced electron concentration. The spectrum of the returned signal is studied with a resolution of ten seconds. Spectral information is used to increase altitude resolution and observe the motion of scatterers. The expected variation in signal-to-noise ratio with solar flux is observed. It is found that variations in the scattered power generally do not correspond to the gravity waves which are simultaneously observed. Turbulent layers are observed at altitudes with high shear in the horizontal velocity and at altitudes with low shear. The ten-second resolution is necessary to distinguish meteor echoes from echoes produced by the advection of a scattering layer through the radar beam. Author

N83-34495*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EARTH'S MAGNETIC FIELD AS A RADIATOR TO DETECT COSMIC RAY ELECTRONS OF ENERGY GREATER THAN 10 TO THE 12TH POWER eV
S. A. Stephens and V. K. Balasubrahmanyan Jul. 1983 51 p refs Submitted for publication
(NASA-TM-85068; NAS 1.15:85068; Rept-660) Avail: NTIS HC A04/MF A01 CSCL 04A

The synchrotron emission by electrons of energy greater than a few TeV in Earth's magnetic field was examined. An omnidirectional detector, it is shown, can be satisfactorily used to estimate the energy. The collecting power of the detector, it is also shown, is a sensitive function of the area of the detector, the energy of electron, and the number of photons required to identify an electron. The event rate expected was calculated using an ideal balloon-borne detector. Author

N83-34496*# National Aeronautics and Space Administration, Washington, D. C.
GEODYNAMIC PROGRAM OFFICE Annual Report
May 1983 169 p refs
(NASA-TM-85842; EE-8; NAS 1.15:85842) Avail: NTIS HC A08/MF A01 CSCL 08G

Program activities and achievements in 1982 of the geodynamic program are summarized. The significant results presented are summarized. E.A.K.

N83-34497*# Michigan Univ., Ann Arbor. Space Physics Research Lab.
AE AERONOMY STUDIES Final Report
James C. G. Walker Mar. 1983 121 p refs
(Contract NAS5-24331)
(NASA-CR-170572; NAS 1.26:170572) Avail: NTIS HC A06/MF A01 CSCL 04A

Chemical processes in the thermosphere and ionosphere using AE data were studied. These data were analyzed and interpreted in such a way as to verify and correct laboratory measured rate coefficients, obtain values for rate coefficients not measured in the laboratory, and to reveal and correct inadequacies in existing models of thermospheric chemistry. This activity stimulated new work in the laboratory measurement of rate coefficients by revealing errors in existing measurements and by suggesting new measurements that need to be made. Author

N83-34498*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CRUSTAL DYNAMICS PROJECT SITE SELECTION CRITERIA
Richard Allenby Mar. 1983 34 p
(NASA-TM-85084; NAS 1.15:85084; Rept-922) Avail: NTIS HC A03/MF A01 CSCL 08G

The criteria for selecting site locations and constructing observing pads and monuments for the Mobile VLB1 and the satellite laser ranging systems used in the NASA/GSFC Crustal Dynamics Project are discussed. Gross system characteristics (size, shape, weight, power requirement, foot prints, etc.) are given for the Moblas, MV-1 through 3, TLRS-1 through 4 and Series instruments. Author

N83-34499# Teledyne Firth Sterling, Nashville, Tenn.
SEISMIC DATA ANALYSIS CENTER Final Report
10 Jan. 1983 52 p refs
(Contract F33600-81-C-0279; ARPA Order 2551)
(AD-A126428; SDAC-TR-82-4; VSC-TR-83-4) Avail: NTIS HC A04/MF A01 CSCL 09/2

The effort required to operate and maintain the Seismic Data Analysis Center during the fiscal year of 1981 is described. Statistics concerning the operational effectiveness and the utilization of the systems at the Center are also given. The major activities associated with maintaining the operating systems, providing data services, and performing maintenance are discussed. The development effort and improvements made to the systems supporting the geophysical research include capabilities added to the Regional Event Location System and the Automatic Association program. Other tasks reported include the result of implementing a front end processor (called an intelligent line interface) to do real time signal detection, the effects of altering the configuration of the detection systems, and the status of software developed to do interactive discrimination. A computer study was performed to determine a preferred system to accomplish the on-line data recording and support the data services activity. Author

N83-34500# RCA Astro-Electronics Div., Princeton, N. J. Government Systems Div.
SATELLITE MOISTURE RETRIEVAL TECHNIQUES. VOLUME 2: ATMOSPHERIC SOUNDING BIBLIOGRAPHY Final Report
A. Rosenberg, E. C. Hutter, and J. J. Horan Jan. 1983 138 p 2 Vol.
(Contract N00228-81-C-H156)
(AD-A126446; NEPRF-CR-83-01(B)) Avail: NTIS HC A07/MF A01 CSCL 05/2

A bibliography of remote sensing of temperature and humidity is presented in three parts: referenced by year, referenced by subjects, and referenced by measurement instruments. Author

N83-34501# Teledyne Geotechnical, Garland, Tex.
SEISMIC METHODS OF INFRASONIC SIGNAL DETECTION Annual Report
F. J. Mauk, G. G. Sorrells, L. Grant, and K. B. Taylor Sep. 1982 147 p refs
(Contract F49620-81-C-0056; ARPA Order 4246)
(AD-A126454; AFOSR-83-0131TR; TR-82-5; AR-1) Avail: NTIS HC A07/MF A01 CSCL 08/11

Infrasonics monitoring using a three-component borehole seismograph and surface microbarograph array show that within a frequency band extending about 0.005 Hz to about 0.05-0.1 Hz, depending on local wind conditions, the infrasonic depth will be no worse than, and can be considerably better than, that observed on a microbarogram. Results lend credence to the hypothesis that, within this frequency band, infrasonic signals generated by sources in the low to moderate kiloton yield range can be seismically observed and can be positively identified without the aid of microbarometric data. Author

N83-34502# Coastal Engineering Research Center, Fort Belvoir, Va.
POSTHURRICANE SURVEY OF EXPERIMENTAL DUNES ON PADRE ISLAND, TEXAS
Bill E. Dahl, Paul F. Cotter, David B. Wester, and Doug D. Drbal Mar. 1983 73 p refs
(AD-A128051; CERC-MR-83-8) Avail: NTIS HC A04/MF A01 CSCL 13/3

This report summarizes the impact of Hurricane Allen (August 1980) on dune configuration, sand accretion or erosion, and changes in the vegetation on north Padre Island. Four experimental foredunes, the result of grass plantings from 1969 to 1973, and an unplanted control section were monitored in 1975-1977 and also in 1981. The 1981 posthurricane data were compared where possilbe, with the previous studies. Foredune elevation surveys were completed in March 1981; accompanying vegetation transects were made in July 1981. Hurrican Allen causes erosion of the dune face of all the experimental dunes, but caused a breach in

only one dune. The beach elevations had returned to approximately prehurricane heights by the time the area was resurveyed. The unplanted control dune provided little resistance to waves generated by the storm and a large quantity of sand was deposited inland. GRA

N83-34503# Purdue Univ., Lafayette, Ind.
GEOPHYSICAL-GEOLOGICAL STUDIES OF POSSIBLE EXTENSIONS OF THE NEW MADRID FAULT ZONE Annual Report
W. J. Hinze, L. W. Braile, G. R. Keller (Texas Univ., El Paso), and E. G. Lidiak (Pittsburg Univ.) May 1983 99 p refs Sponsored by Nuclear Regulatory Commission
(DE83-902289; NUREG/CR-3174-Vol-1) Avail: NTIS HC A05/MF A01

An integrated geophysical/geologic program is being conducted to evaluate the rift complex hypothesis as an explanation for the earthquake activity in the New Madrid Seismic Zone and its extensions, to refine knowledge of the rift complex, and to investigate the possible northern extensions of the New Madrid Fault Zone, especially its possible connection to the Anna, Ohio seismogenic region. Geologic studies are being used to confirm the existence of rift zones suggested by geophysical signatures with identification of pre-upper Cambrian sedimentary rocks in the subsurface. Drillhole basement lithologies are being investigated to aid in tectonic analysis and geophysical interpretation, particularly in the Anna, Ohio area. Gravity and magnetic modeling combined with limited seismic reflection studies in southwest Indiana are interpreted as confirming speculation that an arm of the New Madrid Rift Complex extends northeasterly into Indiana. Sufficient evidence are unavailable to test the hypothesis that this feature extends into the Anna, Ohio area. DOE

N83-34504# Louisiana State Univ., Baton Rouge. Inst. for Environmental Studies.
QUATERNARY GEOLOGY OF RAYBURNS SALT DOME: NORTH LOUISIANA SALT DOME BASIN
Charles R. Kolb and Joseph C. Holmes Feb. 1983 176 p refs
(Contracts DE-AC06-76RL-01830; DE-AC02-83CH-10140)
(DE83-007232; ONWI-416) Avail: NTIS HC A09/MF A01

A 20 to 100 ft sequence of fine sediments with increasing amounts of sand and chert gravel with depth underlies a topographic low above the salt dome. These deposits are of Quaternary (specifically late Quaternary) age. A boulder zone consisting of water worn calcite boulder and cobbles in a matrix of dark gray and tan sandy clay and clayey sand is present beneath these gravel bearing Quaternary deposits and above the anhydrite gypsum caprock. Isotopic studies have identified the boulder zone as the remnant of a once continuous calcite caprock cover that was subjected to subaerial erosion in the geologic past. Generally speaking the anhydrite gypsum caprock is closer to the surface near the center of the topographic low over the salt dome and slopes down toward the outer limits of this low. However, the caprock surface rises again very abruptly and very steeply at the extreme edges of the low, suggesting that an underground ridge of caprock, sometimes only 15 ft below the surface, completely encircles the outer boundaries of the low. The only outlet to the central topographic low that could have drained it during Quaternary time is to the south along Fouse Creek, now filled with Quaternary alluvium only 10 to 12 ft deep. DOE

N83-34505# California Univ., Livermore. Lawrence Livermore Lab.
AIRBORNE-TEMPERATURE-SURVEY MAPS OF HEAT-FLOW ANOMALIES FOR EXPLORATION GEOLOGY
Nancy Kerr DelGrande 10 Nov. 1982 14 p refs Presented at the Intern. Symp. on Remote Sensing of Environ., Ft. Worth, Tex., 6-10 Dec. 1982
(Contract W-7405-eng-48)
(DE83-003018; UCRL-87802-Rev-1; CONF-821204-1-Rev-1) Avail: NTIS HC A02/MF A01

Precise airborne temperature surveys depicted small predawn surface temperature differences related to heat flow anomalies at the Long Valley, California, KGRA. Zones with conductive heat flow differences of 45 + or - 16 nu cal/sq cm(s) has predawn surface temperature differences of 1.4 + or - 0.3 C. The warmer zones had hot water circulating in a shallow (less than 60-m-deep) aquifer. Hot wate is a useful geochemical indicator of geothermal and mineral resource potential. The precise airborne temperature survey method recorded redundant infrared scanner signals at two wavelengths (10 to 12 micrometers and 4.5 to 5.5 micrometers) and two elevations (0.3 km and 1.2 km). Ground thermistor probes recorded air and soil temperatures during the survey overflights. Radiometric temperatures were corrected for air path and reflected sky radiation effects. Corrected temperatures were displayed in image form with color coded maps which depicted 0.24 C temperature differences. DOE

N83-34506# Sandia Labs., Albuquerque, N. Mex. Experimental Programs Div.
A TRANSIENT CREEP MODEL FOR SALT DURING STRESS LOADING AND UNLOADING
Darrell E. Munson and P. R. Dawson (Cornell Univ., Ithaca, N.Y.) Sep. 1982 57 p refs
(Contract DE-AC04-76DP-00789)
(DE83-002137; SAND-82-0962) Avail: NTIS HC A04/MF A01

An empirical model is developed which accurately predicts the transient response of salt creep to incremental and decremental changes in stress and temperature. Even though the model is empirical, it is derived from a firm theoretical framework based upon the deformation-mechanism map for the micromechanical deformation process and treats both steady-state and transient creep. In the model, transient functions modify the steady-state creep behavior. The description considers hypothetical potential functions in order to obtain strain rate vs. strain functions for the workhardening and recovery that occurs during transient creep. Conventional creep tests or stress-drop tests are analyzed using new methods for the complete evaluation of all parameters of the model. Then, the model is applied to stress-drop experimental results for complete recovery. Parameters for the model are also developed for southeastern New Mexico salt and are used to describe experimental results from tests that have complex loading and unloading histories. The model predictions compare well with the experimental results. DOE

N83-34507# California Univ., Livermore. Lawrence Livermore Lab.
RESPONSIBILITIES, OPPORTUNITIES AND CHALLENGES IN GEOPHYSICAL EXPLORATION
R. J. Rytle 4 May 1982 8 p refs Presented at the 23rd US Symp. on Rock Mech., Berkeley, Calif., 25-27 Aug. 1982
(Contract W-7405-eng-48)
(DE82-016777; UCRL-87593; CONF-820803-12) Avail: NTIS HC A02/MF A01

Geophysical exploration for engineering purpose is conducted to decrease the risk in encountering site uncertainties in construction of underground facilities. Current responsibilities, opportunities and challenges for those with geophysical expertise are defined. These include: replacing the squiggly line format, developing verification sites for method evaluations, applying knowledge engineering and assuming responsibility for crucial national problems involving rock mechanics expertise. DOE

N83-34508# California Univ., Livermore. Lawrence Livermore Lab. Earth Science Dept.
SEISMIC EXPERIMENTS AT LAWRENCE LIVERMORE NATIONAL LABORATORY USING RSTN DATA
S. R. Taylor, T. J. Owens, K. K. Nakanishi, P. W. Rodgers, and H. J. Patton 16 May 1983 23 p refs Presented at the 5th Ann. DARPA/AFOSR Symp., Eastsound, Wash., 16 May 1983
(Contract W-7405-eng-48)
(DE83-013047; UCRL-89270; CONF-830579-1) Avail: NTIS HC A02/MF A01

A Regional Seismic Test Network (RSTN) was installed in order to gain experience with advanced seismic monitoring systems. The RSTN is the prototype for a seismic network that could be deployed in the Soviet Union under terms of a Comprehensive

Test Ban Treaty (CTBT). The RSTN is intended to provide three component, digital seismic data at both regional and teleseismic distances over a broad frequency range (0.02 to 10 Hz). Several projects were undertaken using seismic data from the RSTN system to characterize properties of the network and validate its performance. The data from the network was used to investigate loca crustal structure, explain anomalous arrivals, verify the accuracy of seismograms recorded at the stations, and determine the yield of seismic events using measurements of seismic moments. Brief summaries of these projects are presented. DOE

N83-34509# Institute of Geological Sciences, London (England).
GEOMAGNETIC RESULTS 1981: ESKDALEMUIR, HARTLAND AND LERWICK OBSERVATORIES
1983 72 p refs
(Geeomagnetic-Bull-14; ISBN-0-11-884345-1) Avail: NTIS HC A04/MF A01

The results of the standard observations carried out at the magnetic laboratory during 1981 are presented. The measurements show hourly means of horizontal and vertical intensity and hourly means of magnetic declination. The K indices for the year and mean monthly and annual variations for the geomagnetic elements are included. Author (ESA)

N83-34510# Puerto Rico Univ., Mayaguez. Water Resources Research Inst.
HYDROLOGIC CHARACTERISTICS OF LIMESTONE IN NORTHERN PUERTO RICO IN RELATION TO DEPOSITIONAL ENVIRONMENTS AND DIAGENESIS Final Completion Report
G. A. Seiglie and M. T. Moussa 1983 103 p refs
(Contract DI-14-34-0001-1141)
(PB83-175257; OWRT-A-044-PR(1); W83-02180) Avail: NTIS HC A06/MF A01 CSCL 08G

The stratigraphy and depositional environments of the Tertiary limestone belt, northwestern Puerto Rico is discussed. A determination of their lineaments and sinkholes is made. The petrography, macrofossils and foraminifers of the Tertiary limestone formations were studied to determine the lithostratigraphic successions, biostratigraphy and the ancient environments. The lithology, the macrofossils and specially the foraminifers were used to study the depositional paleoenvironments of the northwestern Puerto Rico formations. Author (GRA)

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N83-34511 Minnesota Univ., Minneapolis.
COMPOSITION AND WINDS IN THE EARTH'S LOWER THERMOSPHERE Ph.D. Thesis
Lyle Harold Johnson 1982 197 p
Avail: Univ. Microfilms Order No. DA8301951

Under the atmosphere Explorer project an Open Source Mass Spectrometer (OSS) from the University of Minnesota was placed into Earth orbit onboard each of the three satellites in the program. These spectrometers were designed to measure the neutral atmospheric composition in the lower thermosphere. Some of the results from analysis of the data provided by these spectrometers is presented here. Special effort was made to analyze measurements near and below 200km altitude. The second satellite in the series was placed into a polar orbit and provided measurements largely characterized by summer to winter differences during a time of low solar and geomagnetic activity. Neutral composition measurements determined from this satellite compare favorably to other reported measurements from satellite, rocket, and ground based instruments. Also shown is a detailed comparison at 150 and 200 km between these measurements and neutral compositions as predicted by three current thermospheric models: CIRA 72, Esro 4, and MSIS. Dissert. Abstr.

N83-34512 Wisconsin Univ., Madison.
INTRASEASONAL FLUCTUATIONS IN NEAR-GLOBAL-SCALE MODES OF CIRCULATION AND OUTGOING LONGWAVE RADIATION DURING NORTHERN HEMISPHERE WINTER Ph.D. Thesis
Klaus Michael Weickmann 1982 131 p
Avail: Univ. Microfilms Order No. DA8220900

An eigenvector analysis was used to characterize global-scale, intraseasonal variability in satellite-derived outgoing longwave radiation fields and NMC analyzed circulation fields. Five-day averages covering NOV-MAR of 1974-75 through 1979-80 comprised the data sample. The results showed that circulation eigenvectors 2 and 3 (CEV2 and CEV3) described wavenumber 1 and wavenumber 2 index cycles of the extratropical windfield, while radiation eigenvectors 2 and 4 described large scale fluctuations in tropical cloudiness. In 5 of 7 years (1974-75 through 1980-81), the tropical cloudiness fluctuations displayed a tendency for eastward propagation in the region from Africa to the central equatorial Pacific. In some winters, the intraseasonal fluctuations in the extratropical windfield were closely coupled to the propagating feature in tropical cloudiness. The 'period' displayed by the fluctuations in different winters (NOV-MAR) ranged from 35 to 80 days. Dissert. Abstr.

N83-34513 Institut d'Aeronomie Spatiale de Belgique, Brussels.
SELF-OSCILLATIONS, EXTERNAL FORCINGS, AND CLIMATE PREDICTABILITY
C. Nicolis 1983 31 p refs Presented at Conf. Milankovitch and Climate: Understanding the Response to Orbital Forcing Submitted for publication
(Contract EEC-CLI-027-B(G))
(Aeronomica-Acta-A-263-1983) Avail: Issuing Activity

A class of nonlinear climate models involving two simultaneously stable states, one stationary and one time-periodic, is analyzed. The evolution is cast in a universal, normal form from which a basic difference between radial and phase variables emerges. It is shown that the phase variable has poor stability properties which are at the origin of progressive loss of predictability when the oscillator is autonomous. The coupling to an external periodic forcing is considered. Solutions which correspond to a sharp and reproducible behavior of the phase are found. In this way predictability is ensured. It is shown that the response can be considerably amplified by a mechanism of resonance with certain harmonics of the forcing. The implication of the results on the mechanism of quaternary glaciations is emphasized. Author (ESA)

N83-34514*# Universities Space Research Association, Boulder, Colo.
THE USRA WORKSHOP REPORT: ELECTROSTATIC FOG DISPERSAL Interim Report
M. H. Davis, ed. 13 Jun. 1983 56 p refs Workshop held at Boulder, Colo., 1-2 Feb. 1983
(Contract NAS8-33730)
(NASA-CR-170802; NAS 1.26:170802; USRA-AP-83-08) Avail: NTIS HC A04/MF A01 CSCL 04B

The Workshop was held at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado, on February 1-2, 1983. The Workshop was attended by seventeen experts in the scientific fields of fog and cloud physics, charged-particle electrodynamics, atmospheric turbulence, atmospheric electricity, and electrogasdynamics. The major objective of the Workshop was to assess the scientific merits and scientific basis of the proposed system and to assess its potential for operational application. Author

N83-34515*# Environmental Research and Technology, Inc., Concord. Mass.
IMPACT OF SATELLITE DATA ON LARGE-SCALE CIRCULATION STATISTICS AS DETERMINED FROM GLAS ANALYSES DURING FGGE-SOP-1 Final Report
David A. Salstein and Richard D. Rosen Dec. 1982 42 p refs
(Contract NAS5-26515)
(NASA-CR-170578; NAS 1.26:170578) Avail: NTIS HC A03/MF A01 CSCL 04B

A study using the analyses produced from the assimilation

cycle of parallel model runs that both include and withhold satellite data was undertaken. The analyzed state of the atmosphere is performed using data from a certain test period during the first Special Observing Period (SOP) of the Global Weather Exporiment (FGGE). Author

N83-34516*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE ROLE OF THE EQUIVALENT BLACKBODY TEMPERATURE IN THE STUDY OF ATLANTIC OCEAN TROPICAL CYCLONES
Joseph Steranka (General Software Corp., Landover, Md.), Edward B. Rodgers, and R. Cecil Gentry (Clemson Univ.) Aug. 1983 66 p refs
(NASA-TM-85090; NAS 1.15:85090) Avail: NTIS HC A04/MF A01 CSCL 04B

Satellite measured equivalent blackbody temperatures of Atlantic Ocean tropical cyclones are used to investigate their role in describing the convection and cloud patterns of the storms and in predicting wind intensity. The high temporal resolution of the equivalent blackbody temperature measurements afforded with the geosynchronous satellite provided sequential quantitative measurements of the tropical cyclone which reveal a diurnal pattern of convection at the inner core during the early developmental stage; a diurnal pattern of cloudiness in the storm's outer circulation throughout the life cycle; a semidiurnal pattern of cloudiness in the environmental atmosphere surrounding the storms during the weak storm stage; an outward modulating atmospheric wave originating at the inner core; and long term convective bursts at the inner core prior to wind intensification. Author

N83-34517# Naval Postgraduate School, Monterey, Calif.
FORECASTING TROPICAL CYCLONE RECURVATURE USING AN EMPIRICAL ORTHOGONAL FUNCTION REPRESENTATION OF THE SYNOPTIC FORCING M.S. Thesis
Thomas D. Lage Dec. 1982 77 p refs
(AD-A126711) Avail: NTIS HC A05/MF A01 CSCL 04/2

Empirical orthogonal function (EOF) representation of the synoptic forcing is combined with past meridional and zonal displacements (persistence) to forecast tropical cyclone recurvature at 36, 54 and 72 h. Recurvature is defined. Recurvature is a net displacement northward of 315 deg during the forecast period or the attaining of northeastward motion during the 12 hours prior to the forecast period. The combination of persistance and EOF coefficients consistently out-performed the individual methods for forecasting recurvature in both the dependent and independent samples. Evaluation scores were the Brier p-score, the heidke skill score and percent correctly forecast. Seven forecast aids were tested for ability to forecast tropical cyclone recurvature at 24, 48, and 72 h. GRA

N83-34518# Alberta Univ., Edmonton. Dept. of Meteorology.
COMPUTER MODELING OF TIME-DEPENDENT RIME ICING IN THE ATMOSPHERE
Edward P. Lozowski and Myron M. Oleskiw Hanover, N.H. CRREL Jan. 1983 81 p refs
(DA Proj. 4A1-61102-AT-24)
(AD-A126404; CRREL-83-2) Avail: NTIS HC A05/MF A01 CSCL 08/12

A numerical model of rime ice accretion on an arbitrary two-dimensional irfoil is presented. The physics of the model are described and results are presented that demonstrate, by comparison with other theoretical data and experimental data, that the model predictions are believable. Results are also presented that illustrate the capability of the model to handle time-dependent time ice accretion, taking into account the feedback between the ice accretion and the airflow and droplet trajectory fields. Author

N83-34519# Weather Squadron (7th), APO New York 09165. Detachment 2.
TERMINAL FORECAST REFERENCE NOTEBOOK FOR HANAU AAF, GERMANY Final Technical Report
Michael A. Zimmer 22 Apr. 1983 53 p
(AD-A128061) Avail: NTIS HC A04/MF A01 CSCL 04/2

Weather forecasting in Central West Germany, especially in the area of the Hanau Army Airfield, is discussed. The topography of the area and how it affects the weather is discussed. Major weather producing situations, regional forecast problems, the effects of fronts, and the forecasting of fog are discussed. R.J.F.

N83-34520# Range Commanders Council, White Sands Missile Range, N. Mex. Meteorology Group.
RANGE REFERENCE ATMOSPHERE, 0-70 km ALTITUDE, VANDENBERG, AFB, CALIFORNIA
G. G. Boire, O. H. Daniel, R. DeViolini, F. G. Finger, and E. E. Fisher Apr. 1983 213 p refs
(AD-A128125; RCC/MG-362-83) Avail: NTIS HC A10/MF A01 CSCL 04/2

A range reference atmosphere is a model of the Earth's atmosphere over a geographical location of interest. It is used to provide planing data for evaluating environmental constraints for the particular configurations of environment sensitive systems and components being developed or undergoing tests. Using the best available upper atmosphere data base to include rawinsonde, rocketsonde, and possibly other high altitude data sources for the range location, the task is to establish a model of certain statistics for wind and thermodynamic quantities derived in a uniform manner and published in a standardized format. GRA

N83-34521# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). FULDA AAF, WEST GERMANY. PARTS A-F Final Report
Apr. 1983 180 p
(AD-A128123; AD-E850376; USAFETAC/DS-83/010) Avail: NTIS HC A09/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Fulda AAF, West Germany. It contains the following parts: (A)Weather conditions; Atmospheric phenomena; (B)Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperature and relative humidity); and (F) pressure Summary (means, standard, deviations, and observation counts of station pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N83-34522# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). HANAU AAF, WEST GERMANY. PART A-F Final Report
Apr. 1983 400 p
(AD-A128122; AD-E850375; USAFETAC/DS-83/009) Avail: NTIS HC A17/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Hanau AAF, West Germany. It contains the following parts: (A)Weather conditions; Atmospheric phenomena; (B)Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperature and relative humidity); and (F) pressure Summary (means, standard, deviations, and observation counts of station pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N83-34523# Science Applications, Inc., Monterey, Calif.
EVALUATION OF US NAVY TROPICAL CYCLONE STORM

SURGE REQUIREMENTS IN THE WESTERN NORTH PACIFIC AND INDIAN OCEANS Final Report
Andrew J. Compton Monterey, Calif. Naval Environmental Prediction Research Facility Feb. 1983 141 p refs
(Contract N00228-81-C-H551)
(AD-A128796; SAI-PN-1-425-02-423; NEPRF-CR-83-02) Avail: NTIS HC A07/MF A01 CSCL 15/3

This document reports the results of a three-phased evaluation of the tropical cyclone storm surge threat to nine sites of U.S. Navy interest located in the western North Pacific and Indian Oceans: Inchon, Chinhae, Pusan, Yokosuka Sasebo, Buckner Bay, Subic Bay, Guam, and Diego Garcia. A preliminary literature search was conducted to determine storm surges of record. Visits were made to eight of the nine locations to gather on-site data and conduct interviews. The third phase consisted of an evaluated of collected data to determine sites with the greatest threat of storm surge, and the formulation of conclusions to aid the Navy in mitigating the threat. GRA

N83-34524# Utah State Univ., Logan.
SOLAR ENERGY POTENTIAL, ULTRAVIOLET RADIATION, TEMPERATURE, AND WIND CONDITIONS IN MOUNTAINOUS REGIONS Final Report
Inge Dirmhirn Jul. 1982 243 p refs
(Contracts DE-AS07-77ET-20193; EG-77-S-07-1656)
(DE82-022177; DOE/ET-20193/T1) Avail: NTIS HC A11/MF A01

Solar irradiance is considerably modified by mountainous terrain. Several parameters dominate in changing the radiative energy from the Sun and sky. They are mainly: elevation, and the reduced pathlength of the solar rays in the atmosphere, generally thinner clouds in higher atltitudes, reflection processes from terrain above the solar detector, and the pronounced enhancement of irradiance by multiple reflection between snowcovered terrain and the atmosphere, especially at cloud-covered sky. An attempt was made to parameterize detected solar and diffuse irradiance according to these effects. Data from five stations in the Utah and Colorado Rocky Mountains, collecting direct and diffuse, and 50 deg tilted irradiance over a period of three years provided the base for the models on elevation, cloud amount, and multiple reflection. A new model for the diffuse irradiance on tilted surfaces was developed. A mathematical model was designed to calculate the received irradiance in valleys of any slope angle, azimuth, albedo, and ratio of diffuse to direct solar irradiance. DOE

N83-34525# National Climatic Center, Asheville, N. C.
A DUST CLIMATOLOGY OF THE WESTERN UNITED STATES
M. J. Changery Apr. 1983 44 p refs
(Contract NRC-FIN-B1074)
(DE83-901961; NUREG/CR-3211) Avail: NTIS HC A03/MF A01; also available HC SOD $4.75

Beginning and ending times of dust-caused visibility values were extracted from original records for approximately 180 stations in the western US for the general period of record 1948 to 1977. Maps are presented depicting the annual total number of hours with visibility below specified values, annual number of dust episodes, dust episode durations, season of occurrence, and probability of thunderstorm-inducement. DOE

N83-34526# Electricite de France, Clamart. Service Materiel Electrique.
EIGHT YEARS EXPERIENCE OF LIGHTNING AT SAINT-PRIVAT-D'ALLIER (FRANCE) [HUIT AND D'EXPERIENCE SUR LA FOUDRE A SAINT PRIVAT-D'ALLIER PAR LE GROUPE DE RECHERCHES DE SAINT-PRIVAT-D'ALLIER]
C. Gary 10 Jun. 1982 42 p refs In FRENCH Submitted for publication
(HM-00-1065) Avail: NTIS HC A03/MF A01

The equipment of a lightning investigation station, and results concerning lightning effects on high voltage power lines and telecommunication networks are described. A rocket system for triggering lightning with up to 93% success rate is presented. The flashes are very similar to natural ones between high structures and storm clouds, but peak current is more like that of the secondary waves of natural flashes. The system enables electromagnetic wave propagation, localization of atmospheric electric charges, pylon response, equipment protection, and flash time histories, to be studied. Author (ESA)

N83-34527# Electricite de France, Clamart. Div. Appareillage.
GUIDE FOR STUDIES OF THE PROTECTION OF INSULATED SUBSTATIONS AGAINST LIGHTNING [GUIDE POUR LES ETUDES DE PROTECTION DES POSTES BLINDES CONTRE LA FOUDRE]
G. Bernard 18 Jan. 1982 23 p refs In FRENCH
(HM-71-04672; EMTP-G-7) Avail: NTIS HC A02/MF A01

Methods for representing the elements of electricity substations in numerical models used for lightning protection studies are described. System configurations are classed according to the chances of insulation capacity being exceeded. For configurations at risk, an analysis based on distributed parameter system techniques is performed. Overhead power lines, cables, insulated sections, transformers, spark gaps, lightning conductors, and junctions are represented. Author (ESA)

N83-34528# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
DATA INTERCOMPARISON THEORY. 1: MINIMAL SPANNING TREE TESTS FOR LOCATION AND SCALE DIFFERENCES
Rudolph W. Preisendorfer and Curtis D. Mobley Dec. 1982 55 p
(PB83-182311; NOAA-TM-ERL-PMEL-38; NOAA-83031409) Avail: NTIS HC A04/MF A01 CSCL 04B

When intercomparing two data sets, each of n samples of same field at p points in space, the question often arises about the relative sizes of their averages over time and about their relative variances. In the note we consider two geometric ways of answering this question. The basis geometric concept is that of a minimal spanning tree (MST) made from the union of the data sets when they are considered as n-point swarms in euclidean p-space EP. The MST is the network of straight lines in EP that connects the points of the pooled swarms with the least possible total length of its segments. An application of the MST scale test was made to the problem of defining natural seasons over the U.S. mainland using a 46-year temperature record. The results is a novel partition of the 12 months of the year into new seasons based on months with comparable temperature variances. Author (GRA)

N83-34529# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
DATA INTERCOMPARISON THEORY. 3: S-PHASE AND T-PHASE TESTS FOR SPATIAL PATTERN AND TEMPORAL EVOLUTION
Rudolph W. Preisendorfer and Curtis D. Mobley Dec. 1982 130 p
(PB83-182329; NOAA-TM-ERL-PMEL-40; NOAA-83031403) Avail: NTIS HC A07/MF A01 CSCL 04B

A set of statistics which describe differences in spatial patterns and temporal evolutions of data sets are derived. These are derived from the SHAPE statistic and its derivates which are all of a correlation nature, thereby permitting immediate statistical significance tests using existing tables. However, it is also shown that correlation type statistics, especially in multivariate settings, are limited in their ability to discern differences in spatial and temporal patterns of data sets. Two multiparameter tests (the S-Phase and T-Phase) are devised to remedy this limitation and their properties are given a preliminary examination. Further multiparameter tests are devised and outlined. GRA

N83-34530# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
DATA INTERCOMPARISON THEORY. 4. TERCILE TESTS FOR LOCATION, SPREAD AND PATTERN DIFFERENCES
Rudolph W. Preisendorfer and Curtis D. Mobley Dec. 1982 55 p refs
(PB83-182337; NOAA-TM-ERL-PMEL-41; NOAA-83031404) Avail: NTIS HC A05/MF A01 CSCL 04B

Two data sets can be examined for closeness by considering them as field maps and pretending that one is trying to forecast the other. This is done applying some recently devised forecast verification techniques to the pair of of data sets. The technique we apply for the purpose is the tercile (or Trinomial Stochaster) technique wherein, over a given set of points in space, the two fields have their 0-class, 1-class and 2-class errors tallied, and examined for statistical significance. These class errors can be used to gauge the closeness of the three main attributes of the data sets; their locations (akin to averages), spreads (akin to variances), and (spatial or temporal) patterns. Author (GRA)

N83-34531# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
DATA INTERCOMPARISON THEORY. 5: CASE STUDY. EFFECTS OF OBJECTIVE ANALYSIS ON A TROPICAL PACIFIC SEA SURFACE TEMPERATURE SET
Rudolph W. Preisendorfer and Curtis D. Mobley Dec. 1982 89 p (PB83-182345; NOAA-83031405; NOAA-TM-ERL-PMEL-42) Avail: NTIS HC A05/MF A01 CSCL 04B

A study is made of an objective analysis scheme by Liu which has SST-gradient-dependent smoothing and correction operations, along with data-weight and outliner cutoff features. The scheme is an elaboration of that originally devised by Cressman and subsequently expanded by Levitus and Oort. The object of the study is to apply certain new data intercomparison techniques (developed in the four earlier works of the present series) to the data set produced by Liu's scheme, with the goal in mind to determine how the various features of the new objective analysis scheme change the location (average), scale (variance), and pattern properties of the data set. In general it is found that the average properties of a data set are largely unchanged by application of the above features of Liu's scheme. Author (GRA)

N83-34532# National Oceanic and Atmospheric Administration, Rockville, Md. Federal Coodinator for Meteorlogical Services and Supporting Research.
REVIEW OF FEDERAL RESEARCH AND DATA COLLECTION PROGRAMS FOR IMPROVING TROPICAL CYCLONE FORECASTING
Jan. 1983 111 p
(PB83-175935; NOAA-83030903; FCM-R2-1982) Avail: NTIS HC A06/MF A01 CSCL 04B

Basic characteristics of tropical cyclones; NOAA and DOD tropical cyclone warning centers; forecast accuracies; what is needed to improve the forecast; and general interagency approach to improve tropical cyclone forecasting are discussed. DOE

N83-33828*# National Weather Service, Washington, D.C.
AVIATION WEATHER SERVICES
Charles H. Sprinkle *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 14-16 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

N83-33830*# Department of Defense, Washington, D. C. Office of Environmental and Life Sciences.
DEPARTMENT OF DEFENSE METEOROLOGICAL AND ENVIRONMENTAL INPUTS TO AVIATION SYSTEMS
Paul D. Try *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 19-20 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

N83-33831*# Federal Aviation Administration, Washington, D.C. Office of Associate Administrator for Development and Logistics.
FEDERAL AVIATION ADMINISTRATION WEATHER PROGRAM TO IMPROVE AVIATION SAFETY
Robert W. Wedan *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 21-25 refs (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

N83-33832*# National Aeronautics and Space Administration, Washington, D. C.
APPLICATIONS OF THE SPACE PERSPECTIVE TO AVIATION
John S. Theon *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 34-36 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

N83-33833*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A CURSORY GLANCE AT RESULTS FROM NASA'S B-57B GUST GRADIENT PROGRAM
Warren Campbell *In its* Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 38-42 Original contains color illustrations (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

N83-33834*# National Weather Service, Silver Spring, Md.
GEM: STATISTICAL WEATHER FORECASTING PROCEDURE
Robert G. Miller *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 42-44 ref (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

N83-33836# Federal Aviation Administration, Washington, D.C. Office of Environment and Energy.
EXISTING WIND OBSERVATION NETWORK
David E. Winer *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 56-60 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

N83-33837*# Finnish Meteorological Inst., Helsinki. Aviation Weather Service.
MARKED SURFACE INVERSIONS AND WIND SHEAR: A SAFETY RISK FOR DEPARTING AIRCRAFT
Ossi Korhonen *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 61-62 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

N83-33838*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LIGHTNING STRIKE EXPERIENCE IN THE NASA F-106B STORM HAZARDS PROGRAM
Norman L. Crabill *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 63-65 (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

N83-33839*# Royal Aircraft Establishment, Bedford (England).
WIND SHEAR AND VORTEX WAKE RESEARCH IN UK, 1982
Alan A. Woodfield *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 66-83 refs (For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

N83-33840*# National Center for Atmospheric Research, Boulder, Colo.
JOINT AIRPORT WEATHER STUDIES (AWS) PROJECT
John McCarthy *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Apr. 1983 p 85-95 Original contains color illustrations

(For primary document see N83-33827 22-01)
Avail: NTIS HC A07/MF A01 CSCL 04B

N83-34416# World Meteorological Organization, Geneva (Switzerland).
AGROMETEOROLOGY: STATE OF PROGRESS, GOALS [LA METEOROLOGIE AGRICOLE: SON ETAT D'AVANCEMENT, SES BUTS]
D. Rijks *In* ESA First Intern. Training Sem. on Remote Sensing Appl. to Operational Agrometeorol. in Semi-Arid Countries Jul. 1983 p 1-5 In FRENCH (For primary document see N83-34415 22-43)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 60

N83-34425# Reading Univ. (England). Dept. of Meteorology.
PRECIPITATION ESTIMATION [ESTIMATION DES PRECIPITATIONS]
G. Dugdale *In* ESA First Intern. Training Sem. on Remote Sensing Appl. to Operational Agrometeorol. in Semi-Arid Countries Jul. 1983 p 55-70 refs In FRENCH (For primary document see N83-34415 22-43)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 60

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N83-34533# Woods Hole Oceanographic Institution, Mass. Dept. of Physical Oceanography.
RESEARCH INTO THE STRUCTURE AND STABILITY OF BAROCLINIC NON-LINEAR CURRENTS IN A ROTATING FLUID Final Technical Report, 1 Oct. 1980 - 30 Sep. 1982
John A. Whitehead, Jr. Mar. 1983 217 p refs
(Contract N00014-81-C-0010; Grant NSF OCE-80-18322)
(AD-A126396; WHOI-83-11) Avail: NTIS HC A10/MF A01 CSCL 08/3

The structure and stability of baroclinic nonlinear currents in a rotating fluid was investigated. A rotating version of the dam break problem in which a density current is generated after a barrier was removed was studied. The speed of the current and its width and depth were measured. Properties of a limiting bore solution for rotation density currents predicted earlier are incorporated to predict the speed of the nose of the current. The stability of a free isolated baroclinic jet whose free surface in cross section intersects the water surface at two points was studied. The waves permit the release of both kinetic and potential energy. A current of buoyant fluid at the free surface of a lower layer was studied and it is observed that the current is always unstable. It is shown that a coastal density current in a rotating system is unstable to downstream wave disturbances when the mean potential vorticity increases towards the coast and when the mean current vanishes there. The Rayleigh integral proved that an unbounded geostrophic front of uniform potential vorticity is stable for small perturbations of arbitrary wavelength. Extremum concepts were used to analyze large amplitude disturbances in a boundary layer shear flow with an inviscid and longwave theory. It is found that initially weak horizontal convergences are concentrated and amplified in time.
GRA

N83-34534# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Ice Engineering Research Branch.
PROPERTIES OF UREA-DOPED ICE IN THE CRREL TEST BASIN
Ken-ichi Hirayama (Iwate Univ.) Mar. 1983 54 p refs
(AD-A128219; CRREL-83-8) Avail: NTIS HC A04/MF A01 CSCL 08/12

In the course of model tests with urea-doped ice in the CRREL Ice Engineering Facility test basin, the growth process and the physical and mechanical properties of the model ice were investigated. The parameters which were varied were: urea concentration in the tank water, air temperature during growth, growth duration, and tempering time. Uniformity of ice thickness and ice mechanical properties over the whole tank area were found to be satisfactory. The structure of the urea-doped ice was found to be similar to that of the ice except for a relatively thick incubation layer over a dendritic bottom layer. Empirical relationships were established between: ice thickness and negative degree-hours; mechanical properties and growth temperature, urea concentration, and ice thickness; and reduction in mechanical properties and tempting time. The results of the study are presented in charts which permit reliable scheduling of model tests with required ice thickness and ice flexural strength. Author (GRA)

N83-34535# Naval Ocean Research and Development Activity, Bay St. Louis, Miss.
EFFECTIVE LOW-FREQUENCY GEOACOUSTIC PROPERTIES INFERRED FROM MEASUREMENTS IN THE NORTHEAST ATLANTIC Final Report
Ronald L. Dicus and Rockne S. Anderson Sep. 1982 159 p refs
(AD-A128198; NORDA-21) Avail: NTIS HC A08/MF A01 CSCL 20/1

The purpose of the study documented in this report was to develop geoacoustic models capable of predicting the essential bottom-reflectivity behavior relevant to long-range, low-frequency surveillance systems from acoustic survey measurements and available marine geological data. The approach taken was to: (1) conduct an acoustic experiment obtaining bottom-reflectivity data over a variety of seafloor provinces; (2) analyze the acoustic data using deconvolution-processing and parameter-extraction techniques; (3) develop geoacoustical models of represent the acoustical models to represent the acoutical behavior of the sea floor in terms of geological structure and composition; (4) assemble all geological data relevant to the acoustical-measurement sites for comparison of acoustically inferred and geologically inferred bottom structure; and (5) evaluate state-of-the-art techniques for predicting acoustical behavior from available geological data. The geological provinces studied included three abyssal-plain stations differing in sedimentary characteristics, a moderately rough sedimented plateau, an elongated seamount, and a lower continental rise site.
GRA

N83-34536# Naval Air Development Center, Warminster, Pa. Sensors and Avionics Technology Directorate.
IMPULSE RESPONSE OF THE OCEAN FLOOR: MATHEMATICAL MODELING Final Report on phase 2
Thomas B. Gabrielson Apr. 1983 76 p refs
(AD-A128124; NADC-82254-30) Avail: NTIS HC A05/MF A01 CSCL 20/1

Success in probing the ocean floor acoustically depends on the ability to resolve physical features. Since this amounts to temporal resolution of the received signal, short-duration transient signals are ideal for these measurements. Procedures for propagation prediction of such acoustic transients are developed as a tool for interpreting ocean floor measurements. Some of the special features of time-dependent propagation are discussed in contrast with the usual continuous wave solutions and asymptotic solutions for the field integral are related to various types of propagation.
Author (GRA)

N83-34537# National Marine Fisheries Service, Washington, D.C.
SEA LEVEL VARIATIONS AT MONTEREY, CALIFORNIA
Dale Emil Bretschneider and Douglas R. McLain Jan. 1983 58 p
(PB83-170571; NOAA-TR-NMFS-SSRF-761) Avail: NTIS HC A04/MF A01 CSCL 08C

Sea level data from Monterey, Calif., during the period 1963 through 1976 were compared with data from coastal stations from Peru to Alaska. Sea level fluctuations at Monterey were correlated with data from these stations, particularly those to the south. The causes of sea level fluctuations at Monterey were investigated by correlation, regression, and spectral analysis of sea level with atmospheric pressure, zonal and meridional wind stress, Ekman

and Sverdrup transport, surface temperature and salinity, and dynamic height data from nearby locations. Of these variables, dynamic height was the best predictor of sea level fluctuations. Atmospheric pressure, surface temperature, and meridional wind stress were of secondary importance. The prediction was better during the Davidson Current period than during the upwelling period. GRA

N83-34538# Science Applications, Inc., La Jolla, Calif. Div. of Environmental Chemistry and Geochemistry.
GEORGES BANK MONITORING PROGRAM: ANALYSIS OF HYDROCARBONS IN BOTTOM SEDIMENTS AND ANALYSIS OF HYDROCARBONS AND TRACE METALS IN BENTHIC FAUNA Final Report, Jul. 1981 - May 1982
James R. Payne, James L. Lambach, Randolph E. Jordan, G. Daniel McNabb, Jr., Robert R. Sims, Adel Abasumara, Jane G. Sutton, Don Generro, Susan Gagner, and Robert F. Shokes 31 Dec. 1982 203 p refs
(Contract DI-AA851-CT2-33)
(PB83-180778; SAI/JRB-010-82; MMS/AT/ES-82/01) Avail: NTIS HC A10/MF A01 CSCL 08A

This program was conducted to document background hydrocarbon and trace metal levels in selected sediments and benthic fauna, and to monitor potential short and long term changes which may result from exploratory drilling activities in the Georges Bank Lease Sale 42 region. Aromatic hydrocarbon component levels in the sediments immediately around the Mobil Oil drill rig, Rowan-Midland, were very low (1-5 ng/g dry weight) and essentially constant over the quarterly sampling cruises conducted during the Year One Monitoring Program. Evidence of biogenic and petrogenic hydrocarbons was found in several natural depositional regimes around the periphery of Georges Bank. There is no evidence of drilling fluid related hydrocarbon accumulation in the epitaunal tissues analyzed. GRA

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N83-34539# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES, NO. 40
2 Sep. 1983 119 p refs Transl. into ENGLISH from various Russian articles
(JPRS-84246) Avail: NTIS HC A06

Agrotechnology, biochemistry, biophysics, environment, food technology, genetics, human factors, laser effects, marine mammals, medicine, microbiology, pharmacology and toxicology, psychiatry, psychology, public health, and radiation biology research are discussed For individual titles, see N83-34540 through N83-34542.

N83-34540# Joint Publications Research Service, Arlington, Va.
STUDY OF MECHANISMS OF DELETERIOUS EFFECT OF VISIBLE LIGHT ON HEALTHY RETINA OF ANIMALS
M. A. Ostrovskiy, A. I. Bogoslovskiy, M. V. Zuyeva, A. A. Shvedova, O. I. Shcherbatova, N. L. Sakina, I. B. Fedorovich, L. D. Smirnov, V. A. Shcharpatyy, and M. K. Pulatova *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 40 (JPRS-84246) 2 Sep. 1983 p 3-8 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk (USSR), no. 12, Dec. 1979 p 57-60 (For primary document see N83-34539 22-51)
Copyright. Avail: NTIS HC A06

The effects of the antioxidant, oxypyridine (hydropyridine?) were tested in a dosage of 5 mg/kg, on development of signs of photodegeneration in the rabbits. The deterious effect of light was also tested in frogs, as determined by the retina's electric responses. Author

N83-34541# Joint Publications Research Service, Arlington, Va.
LIGHT-DEPENDENT ELECTRICAL REACTIONS IN CELLS OF SIPHONALES MARINE GREEN ALGAE
P. Perez Alvarez, A. A. Bulychev, M. Denesh, and G. A. Kurella *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 40 (JPRS-84246) 2 Sep. 1983 p 9-15 refs Transl. into ENGLISH from Biol. Nauki (USSR), no. 7, 1982 p 39-44 (For primary document see N83-34539 22-51)
Avail: NTIS HC A06

Studies were made of changes in membrane potential induced by illumination and dark in cells of Siphonales green marine algae. It was established that the electrical reaction of V. ventricosa to light bears some resemblence to the same reaction in another Siphonales alga, Bryopsis plumosa, in spite of the fact that they differ appreciably in size and polarity of difference in eletrical potentials between the vacuole and medium (positive potential of the vacuole in V. ventricosa and negative in B. plumosa). The electrical reaction to illumination has rapid and slow components, which differ in sensitivity to cooling and diurone (promeran?). Exposure of V. ventricosa to the dark after illumination for more than 1-2 min induces temporary depolarization, which is 3-5 times greater in amplitude than depolarization induced by turning the light on. The light induced changes in membrane potential change in size during the period of the depolarization response. It is assumed that the complex nature of light-dependent changes in membrane potential of V. ventricosa is related to excitation of cells with changes from light to darkness. Author

N83-34542# Joint Publications Research Service, Arlington, Va.
ALL-UNION CONFERENCE ON PROBLEMS OF COMPREHENSIVE STUDY OF MAN HELD **c52**
In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 40 (JPRS-84246) 2 Sep. 1983 p 38-42 Transl. into ENGLISH from APN Daily Rev. (USSR), 11 May 1983 p 1-6 (For primary document see N83-34539 22-51)
Copyright. Avail: NTIS HC A06

The problem of the comprehensive study of man is discussed. N.W.

N83-34543*# National Aeronautics and Space Administration, Washington, D. C.
PLANETARY BIOLOGY AND MICROBIAL ECOLOGY. BIOCHEMISTRY OF CARBON AND EARLY LIFE Final Report
Lynn Margulis, ed., Kenneth H. Nealson, ed., and Isobel Taylor, ed. Sep. 1983 177 p refs
(Contract NAGw-277)
(NASA-TM-86043; NAS 1.16:85043; EBT-3) Avail: NTIS HC A09/MF A01 CSCL 06C

Experiments made with cyanobacteria, phototrophic bacteria, and methanogenic bacteria are detailed. Significant carbon isotope fractionation data is included. Taken from well documented extant microbial communities, this data provides a basis of comparison for isotope fractionation values measured in Archean and Proterozoic (preCambrian) rocks. Media, methods, and techniques used to acquire data are also described. Author

N83-34544# Junta de Energia Nuclear, Madrid (Spain). Div. de Isotopos.
EFFECT OF GAMMA IRRADIATION ON THE ACIDIC HYDROLYSIS OF FREE-HEMICELLULOSE THISTLE
C. Suarez, M. D. Paz, and A. Diaz 1983 33 p refs In SPANISH; ENGLISH summary
(JEN-548; ISSN-0081-3397) Avail: NTIS HC A03/MF A01

The effect of gamma-irradiation on the subsequent acidic hydrolysis of free-hemicellulose "Onopordum Nervosum Boiss" thistle is determined. It's shown the influence of gamma-irradiation on the yield of sugar obtained from the batchwise hydrolysis of the cellulose (1% H2SO4 and 180 deg C) at increasing doses. At all irradiation levels studied, the rate of hydrolysis of thistle samples was higher than the rate of hydrolysis of the cellulose from paper treated similarly. The maximum over-all yield of sugar in the irradiated lignocellulosic material was about 66 deg at 100 MRad, less than two times the yield obtainable from the control. The corresponding yield from paper was 53%, 2'3 times that of the control. Irradiation under 1% H2SO4 doesnot enhance the yield anyway. Author

N83-34545# Junta de Energia Nuclear, Madrid (Spain). Div. de Isotopos.
EFFECT OF GAMMA RADIATION ON CHLOROPHYLLS CONTENT, NET PHOTOSYNTHESIS AND RESPIRATION OF CHLORELLA PYRENOIDOSA
C. Martin and J. Fernandez 1983 42 p refs In SPANISH; ENGLISH summary
(JEN-541; ISSN-0081-3397) Avail: NTIS HC A03/MF A01

The effect of five doses of gamma radiation: 10, 100, 500, 1000 and 5000 Gy on chlorophylls content, net photosynthesis and respiration of Chlorella pyrenoidosa was studied. A decrease in chlorophylls levels is produced after irradiation at 500, 1000 and 5000 Gy, being, at first b chlorophyll affected to a greater extent than a chlorophyll. New photosynthesis and respiration decline throughout the time of the observations after irradiation, this depressing effect being much more remarkable for the first one. New photosynthesis inhibition levels of about 30% are got only five hours post irradiation at a dose of 5000 Gy. Radiostimulation by low doses, although obtained in some cases for the 10 Gy dose, was not statistically confirmed. Author

N83-34546# California Univ., Los Angeles.
CARBON BUDGETS IN SYMBIOTIC ASSOCIATIONS
L. Muscatine, P. G. Falkowski, and Z. Dubinsky 10 Apr. 1983 10 p refs Presented at 2nd Intern. Colloq. on Endocytobiolog., Tubingen, West Germany, 10 Apr. 1983
(Contract DE-AC02-76CH-00016)
(DE83-013624; BNL-33155; CONF-830490-1) Avail: NTIS HC A02/MF A01

Methods which permit the estimation of daily budgets for photosynthetically fixed carbon in any alga invertebrate symbiosis are described. Included is a method for estimating total daily translocation which does not involve the use of C-14. A daily carbon budget for a shallow water symbiotic reef coral is presented. DOE

N83-34547# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION, NO. 7
27 Sep. 1982 40 p refs Transl. into ENGLISH from various Russian articles
(JPRS-81865) Avail: NTIS HC A03/MF A01

The effects of monionizing electromagnetic radiation were examined. Topics discussed are: evaluation of biological effects of nonionizing microwaves; evaluation of 8 mm wave electromagnetic fields; orientation of Eristalis Tenax L. drone flies in laser beams; destruction repair of hippocampus by long term exposure to nonionizing microwave radiation; clinical aspects of variable magnetic field effects on postoperative complications; changes in nervous system by long term exposure to microwaves; argon laser treatment for severe forms of herpetic keratitis; laser surgery for neoplasm of the Conjunctiva and eyelids; the use of, pulsed, low frequency electric current in stimulating repair to regenerate bone tissue. For individual titles, see N83-34548 through N83-34556.

N83-34548# Joint Publications Research Service, Arlington, Va.
HYGIENIC EVALUATION OF BIOLOGICAL EFFECTS OF NONIONIZING MICROWAVES
V. S. Belokrinitskiy *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 1-5 refs Transl. into ENGLISH from Gig. Sanit. (USSR), no. 6, Jun. 1982 p 32-34 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

The use microwave generators its biological effects on against it, are discussed. Processes that occur in the body under environmental investigated influence and the concepts normal, pathology and prepathology are assessed. Prepathology is of the greatest importance to a preventive medical discipline, such as hygiene. It is indicated that the only way to prevent any consequences from environmental pollution is to detect prepathology there are no standard for the ranges between normal and prepathology. These concepts are discussed and wide range of changes in physical conditions is alluded to. E.A.K.

N83-34549# Joint Publications Research Service, Arlington, Va.
HYGIENIC EVALUATION OF 8-MM WAVE ELECTROMAGNETIC FIELDS **c52**
Yu. D. Kumanskiy and L. A. Tomashevskaya *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 6-9 refs Transl. into ENGLISH from Gig. Sanit. (USSR), no. 6, Jun. 1982 p 18-20 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

The correlation between changes in some metabolic processes and intenity of electromagnetic fields (EMF) in the 8-mm wave range, generated by meteorological radar stations, was determined to provide further scientific validation of hygienic standards in residential areas. Experiments were performed on 160 albino rats divided into groups corresponding to EFD of 140, 100 and 60 micron W/cm 2. A group of intact animals served as a control. The animals were exposed to EMF for 12 h/day over a period of 4 months. The dynamics of some biochemical processes in experimental animals were assessed. It is found that under the influence of 8-mm wave EMF with EFD of 140 micron W/cm 2 there is an increase in blood serum urea content, which reaches statistically significant values in the 3d and 4th months of exposure. There is a tendency toward elevation of urea level with exposure to EFD of 100 micron W/cm 2. With 60 micron W/cm 2 EFD, blood serum urea content does not differ from the control. Residual nitrogen level rose toward the end of the exposure period with use of EMF with 140 micron W/cm 2 EFD. E.A.K.

N83-34550# Joint Publications Research Service, Arlington, Va.
DISTINCTIONS REFERABLE TO ORIENTATION OF ERISTALIS TENAX L DRONE FLIES IN LASER BEAM
L. I. Frantsevich *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 10-14 refs Transl. into ENGLISH from Biol. Nauki (USSR), no. 4, Apr. 1982 p 26-29 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

Flies and bees present distinct positive phototropism as they move in the beam of a helium-neon laser. Their low sensitivity to red light is compensated by the high power of the beam. At the point of intersection of two beams, drone flies choose the brighter one; standard deviation in distribution of choices constitutes 1.4 log units of relative intensity of beams. It is thought that such a large comparison error is related to the nonstationary nature of illumination of the eye with a narrow beam and short time of simultaneous viewing of two beams. E.A.K.

N83-34551# Joint Publications Research Service, Arlington, Va.
DESTRUCTIVE AND REPARATIVE PROCESSES IN HIPPOCAMPUS WITH LONG-TERM EXPOSURE TO NONIONIZING MICROWAVE RADIATION **c52**
V. S. Belokrinitskiy *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 15-20 refs Transl. into ENGLISH from Byull. Eksp. Biol. Med. (USSR), v. 93, no. 3, Mar. 1982 p 89-92 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

Functional disturbances in the central nervous system from exposure to nonionizing radiation and the pathogenesis of functional disturbances and their clinical manifestations were determined. Ultrastructural changes in the brain with long term exposure to nonionizing microwave radiation (NMR) of low intensity are described. The hippocampus, was studied because it is one of the main elements of the limbic systems that is related to many functions of the body, the memory and mental status. E.A.K.

N83-34552# Joint Publications Research Service, Arlington, Va.
CLINICAL ASPECTS OF EFFECTS OF VARIABLE MAGNETIC FIELDS ON POSTOPERATIVE COMPLICATIONS **c52**
A. A. Verzin and L. N. Kolesnikova *In its* USSR Rept.: Life Sci.

Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 1-5 refs Transl. into ENGLISH from Vestn. Oftalmol. (USSR), no. 3, May-Jun. 1982 p 56-57 Previously announced as A82-46837 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

The use of variable magnetic fields for treatment of many eye diseases is discussed. Magnetic fields are used as an antiinflammation factor, which anesthesizes and stimulates tissue regeneration. A stationary magnetic field to treat penetrating wounds to the eyeball was used. Reduction of the pain syndrome, faster resorption of hyphemas and partial hemophthalmos, regression of signs of traumatic iridocyclitis and faster epithelialization processes are observed. A variable magnetic field, with intensity of 50-100 Oe, was used for treatment of postoperative complications. This magnetic field was generated by an EMI emitter. The variable magnet is powered by alternating current. E.A.K.

N83-34553# Joint Publications Research Service, Arlington, Va.
CHANGES IN NERVOUS SYSTEM OF INDIVIDUALS EXPOSED TO MICRORADIOWAVES FOR LONG PERIOD OF TIME c52
I. N. Gorbach *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 24-28 refs Transl. into ENGLISH from Zdravookhr. Beloruss. (USSR), no. 5, May 1982 p 51-53 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

The effects of electromagnetic fields (EMF) at radio frequencies on the public and individuals serving superhigh frequency (SHF) generators was investigated. No standard criteria for assessing clinical findings or reliable evidence of a link between reactions of the body and expressly the effect of EMF are available and the effects of EMF on man are not yet clarified. Working conditions and reactions to chronic exposure to EMF to detect early signs of pathology are investigated. The nervous system is the most stable and functionally sensitive to EMF. E.A.K.

N83-34554# Joint Publications Research Service, Arlington, Va.
ARGON LASER USED FOR TREATMENT OF PATIENTS WITH SEVERE FORMS OF HERPETIC KERATITIS c52
T. I. Yeroshevskiy, V. M. Petukhov, and V. Yu. Kulagain *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 29-31 refs Transl. into ENGLISH from Vestn. Oftalmol. (USSR), no. 3, May-Jun. 1982 p 33-34 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

Herpetic keratitis is in one of the first places, according to incidence and severity, among other diseases of the cornea. Advances made in the treatment of ophthalmoherpes are described. The use of laser radiation energy is discussed. The energy of argon laser radiation was used for severe cases of ophthalmoherpes. E.A.K.

N83-34555# Joint Publications Research Service, Arlington, Va.
LASER SURGERY FOR NEOPLASMS OF THE CONJUNCTIVA AND EYELIDS c52
G. I. Osipov *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 32-34 refs Transl. into ENGLISH from Vestn. Oftalmol. (USSR), no. 3, May-Jun. 1982 p 51-53 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

The use of carbon dioxide lasers with continuous radiation in oncology was described. Positive results from experimental work on the use of carbon dioxide lasers in ophthalmology were obtained. The obvious advantages and potentials of laser surgery of tumors are emphasized. E.A.K.

N83-34556# Joint Publications Research Service, Arlington, Va.
EXPERIMENTAL BASIS FOR USING PULSED LOW-FREQUENCY ELECTRIC CURRENT FOR STIMULATING BONE TISSUE REPARATIVE REGENERATION
V. A. Landa *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 35 Transl. into ENGLISH from Ortop., Travmatol. Prot. (USSR), no. 2, Feb. 1982 p 52-57 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

Bone regeneration in the radius with a resected diaphysis was studied in rabbits with low frequency pulsed current. The osteogenic effect was greater at an optimum power of 8-10 micro A. Maturation and transformation of callus occurred earlier than in control. Radioisotope studies (85Sr) revealed increased radionuclide accumulation near the wound in treated rabbits. It is shown that the current led to intensified cell proliferation and differentiation with the formation and activation of osteoblasts. Greater blood flow in the damaged area is indicated; blood flow dynamics were similar in the experiment and control but the increase in blood flow rate began earlier with treatment. A higher ATP level in generating tissue in treated animals is revealed. The electrical treatment stimulated glycolysis which increased the energy available for cell proliferation and differentation. Electrical stimulation exerted its favorable effect primarily in stage 1 of bone tissue regeneration. Clinical use of pulsed low frequency electric current is recommended. E.A.K.

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N83-34557# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION, NO. 11
30 Aug. 1983 38 p refs Transl. into ENGLISH from various Russian articles
(JPRS-84221) Avail: NTIS HC A03

Biological and physiological effects of radiation are considered. Dosage, other environmental conditions, and duration are among the factors studied. morphological changes, histochemical responses; and frequency of diseases are experimenally examined. For individual titles, see N83-34558 through N83-34561.

N83-34558# Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL FEATURES AND SOME CONCEPTS OF MECHANISM OF BIOLOGICAL ACTION OF MAGNETIC FIELDS
I. V. Toroptsev and S. V. Taranov *In its* USSR Rept.: Life Sci. (JPRS-84221) 30 Aug. 1983 p 1-17 refs Transl. into ENGLISH from Arkh. Patologii (Moscow), v. 44, no. 12, Dec. 1982 p 3-11 Announced in IAA as A83-34975 (For primary document see N83-34557 22-52)
Avail: NTIS HC A03

An analysis of the literature data and experimental data from investigations conducted both at the orgaism and cell level points to a high sensitivity of biological objects to magnetic fields. The response of living systems to the effect of magnetic fields is characterized by a dependence the magnetic field depends on the field's biotropic parameters. The biological action of the magnetic field is not distinguished by a specific set of morphological changes. The degree of the latter in different tissues is not the same and is determined by the characteristics of their metabolism, structure, and function. At early stages morphofunctional changes occurring under the effect of the magnetic field represent the result of adaptive reconstructions for the purpose of maintenance of homeostasis. The mechanism of biological action of the magnetic field consists of the quantum-biochemical interaction of the magnetic field with the biological substrate, the reception by the living system of the result of the magnetic field effect, and the resonse to this effect. Author

N83-34559# Joint Publications Research Service, Arlington, Va.
EFFECT OF RESOLVING MAGNETIC FIELD SOURCES ON SEVERAL BLOOD INDICATORS WITH A CAROTID ARTERY AUTOVENOUS GRAFT

G. V. Lud, A. M. Demetskiy, Docent Ye. N. Medvedskiy, M. V. Pyshenko, and A. A. Chirkin *In its* USSR Rept.: Life Sci. (JPRS-84221) 30 Aug. 1983 p 18-22 Transl. into ENGLISH from Zdravookhraeniye Belorussii (Minsk), no. 4, Apr. 1983 p 56-57 (For primary document see N83-34557 22-52)
Avail: NTIS HC A03

A resolving artificial magnetic field source on a base of collagen sponge was developed. This source can be implanted at any depth and can be used on any organ or tissue. It is subject to resolution in time and does not require surgery to remove it from the body. Three experiments were conducted on 28 dogs. The first and second series were the controls. In the first series an autovenous graft was applied to the animals; carotid arteries; in the second series a strip of nonmagnetic collagen sponge was attached during the operation after suturing the autovenous transplant; in the third series a strip of collagen sponge containing the magnetic field source was attached to the autovenous transplant. The results indicate that the body's response to the operation is characterized by changes in the morphological and biochemical compositions of the peripheral blood and hypercoagulation. Implantation of a resolving magnetic field source prevents the increase in blood clotting activity and helps strengthen the body's defense mechanisms. J.M.S.

N83-34560# Joint Publications Research Service, Arlington, Va.
FREQUENCY OF DISEASES OF DIGESTIVE ORGANS IN PEOPLE WORKING UNDER CONDITIONS OF COMBINED EFFECT OF LEAD AND SHF-RANGE ELECTROMAGNETIC ENERGY
M. S. Trinos *In its* USSR Rept.: Life Sci. (JPRS-84221) 30 Aug. 1983 p 23-26 refs Transl. into ENGLISH from Gigiyena i Sanitariya (Moscow), no. 9, Sep. 1982 p 93-94 (For primary document see N83-34557 22-52)
Avail: NTIS HC A03

The frequency of diseases of digestive organs at two radio electronic industry plants was examined. All those exained were divided into four groups dependng on working conditions: first, people working under conditions of an isolated effect of SHF-range electromagnetic energy; second, people working under conditions of a combined effect of lead and SHF-range electromagnetic under conditions of an islated effect of lead; fourth, a control group, where workers have no cntact with harmful industrial factors. In the last few years the concentration of lead at work places has not exceeded the maximum permissible concentration, while 10 to 15 years ago it reached 0.01 to 0.03 mg/3 cum. The level of effect of SHF-range electromagnetic energy was often within the standards, but periodically, especially during the last days of the month, slightly exceeded the maximum permissible concenration. The data indicate that pathology of the gastrointestinal tract is observed more often in people working in an environment contaminated with lead than in people working in an environment of SHF-range electromagnetic energy. Functional disorders are noted more often in people working under conditions of SHF-range electromagnetic energy effect. J.M.S.

N83-34561# Joint Publications Research Service, Arlington, Va.
NATURE OF MORPHOFUNCTIONAL RENAL CHANGES IN RESPONSE TO SHF FIELD-HYPOXIA COMBINATION
V. S. Belokrinitskiy and A. N. Grin *In its* USSR Rept.: Life Sci. (JPRS-84221) 30 Aug. 1983 p 27-31 refs Transl. into ENGLISH from Vrachebnoye Delo (Kiev), no. 1, Jan. 1983 p 112-115 (For primary document see N83-34557 22-52)
Avail: NTIS HC A03

The nature and extent of morphofunctional changes in the kidney due to exposure to a combination of UHF field and hypoxia are examined. Factors considered include dosage, multiplicity of exposure, duration of hypoxia, and the time of examination. Histochemical and structural changes in the nephron are evaluated along with overall renal function. J.M.S.

N83-34562* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 248)
Aug. 1983 105 p
(NASA-SP-7011(248); NAS 1.21:7011(248)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 364 reports, articles and other documents introduced into the NASA scientific and technical information system in July 1983. Author

N83-34563 Defence Research Information Centre, Orpington (England).
PRESSURE EFFECTS ON THE HUMAN BODY IN EXPLOSIONS AND THEIR CONSEQUENCES
J. Michelis May 1983 10 p refs Transl. into ENGLISH of Beitraege zur Gerichtlichen Med. (West Germany), v. 39, 1981 p 327-333
(DRIC-T-6881; BR88331) Copyright. Avail: Issuing Activity

The effect of pressure waves from underground explosions on the human body was studied using dummies in a coal mine. Data on individual acceleration, frequency and force phenomena resulting from the effects of wind pressure show that considerable injuries can be expected when a pressure limit of 0.3 bar is exceeded. The injuries received depend on the position and posture of the body. Author (ESA)

N83-34564*# Texas Christian Univ., Fort Worth. Dept. of Psychology.
EFFECTS OF AIRCRAFT NOISE ON HUMAN ACTIVITIES Final Report, 1 Jan. 1980 - 31 Mar. 1983
Malcolm D. Arnoult and Lynne G. Gilfillan 31 Mar. 1983 96 p refs
(Grant NAG1-22)
(NASA-CR-173064; NAS 1.26:173064) Avail: NTIS HC A05/MF A01 CSCL 06C

The effects of aircrft noise on human activities was investigated by developing a battery of tasks (1) representative of a range of human activities and (2) sensitive to the disruptive effects of noise. The noise used were recordings of jet aircraft and helicopter sounds at three levels of loudness--60, 70, and 80 dB(A). Experiment 1 investigated 12 different cognitive tasks, along with two intelligibility tasks included to validate that the noises were being effective. Interference with intelligibility was essentially the same as found in the research literature, but only inconsistent effects were found on either accuracy or latency of performance on the cognitive tasks. When the tasks were grouped into four categories (Intelligibility, Matching, Verbal, and Arithmetic), reliable differences in rated annoyingness of the noises were related to the task category and to the type of noise (jet or helicopter). S.L.

N83-34565*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
OCULAR SCREENING TESTS OF ELEMENTARY SCHOOL CHILDREN
John Richardson Jul. 1983 37 p refs
(NASA-TM-82359; NAS 1.15:82359) Avail: NTIS HC A03/MF A01 CSCL 06P

This report presents an analysis of 507 abnormal retinal reflex images taken of Huntsville kindergarten and first grade students. The retinal reflex images were obtained by using an MSFC-developed Generated Retinal Reflex Image System (GRRIS) photorefractor. The system uses a 35 mm camera with a telephoto lens with an electronic flash attachment. Slide images of the eyes were examined for abnormalities. Of a total of 1835 students screened for ocular abnormalities, 507 were found to have abnormal retinal reflexes. The types of ocular abnormalities detected were hyperopia, myopia, astigmatism, esotropia, exotropia, strabismus, and lens obstuctions. The report shows that the use of the photorefractor screening system is an effective low-cost means of screening school children for abnormalities. Author

N83-34566# Army Medical Intelligence and Information Agency, Washington, D. C.
MILITARY MEDICAL JOURNAL, NO. 12, DECEMBER 1982
1983 90 p refs Transl. into ENGLISH of Voenno-Med. Zh.

(Moscow), no. 12, Dec. 1982
(L-2286) Avail: NTIS HC A05/MF A01

Progress in research and service programs in clinical and military medicine in the Soviety Union was reported. Topics discussed include: public health services; military hospitals; medical support to armed forces, training of medical personnel; development of medical education curriculum; chest wound complication treatment; plastic surgery of facial wounds; antibacterial treatment of pneumonia; radio keratomy for treatment of myopia; bacteria in surgical hospitals; influences of high concentration of carbon dioxide and hypokinesia on the human body; pilot behavior during flight simulator exercises. For individual titles, see N83-34567 through N83-34568.

N83-34567# Army Medical Intelligence and Information Agency, Washington, D. C.
INFLUENCE OF HIGH CARBON DIOXIDE CONCENTRATION AND HYPOKINESIA ON THE HUMAN BODY
M. A. Grebenik *In its* Mil. Med. J., No. 12, Dec. 1982 (L-2286) 1983 p 75-77 refs Transl. into ENGLISH from Voenno-Med. Zh. (Moscow), no. 12, Dec. 1982 (For primary document see N83-34566 22-52)
Avail: NTIS HC A05/MF A01

The exposure of humans for extended periods to a 2% concentration of CO2 was studied. Hyperkapnia develops which has an unfavorable influence on the acid-alkaline balance (AAB). When air containing up to 2% CO2 is breathed for long periods of time, uncompensated acidosis develops. A period of compensated acidosis occurs and elevated ammonia and bicarbonates are released by the kidneys. When breathing air with 1% CO2, moderate compensated gas acidosis was observed. An elevation in the reserve alkalinity of the blood primarily due to increased bicarbonates was characteristic for compensated gas acidosis. It is found that hyperkapnia is combined with relative hypokinesia.
E.A.K.

N83-34568# Army Medical Intelligence and Information Agency, Washington, D. C.
DETERMINING THE FUNCTIONAL RELIABILITY OF A PILOT DURING EXERCISES IN A PILOT TRAINER
V. A. Yegorov, V. A. Sokolov, and B. S. Frantsen *In its* Mil. Med. J., No. 12, Dec. 1982 (L-2286) 1983 p 78-80 refs Transl. into ENGLISH from Voenno-Med. Zh. (Moscow), no. 12, Dec. 1982 (For primary document see N83-34566 22-52)
Avail: NTIS HC A05/MF A01

Functional reliability is the capacity of the human operator to perform work over a given period of time without failure and retain the required working qualities when the task becomes significantly complicated which is particularly important in flying activity was examined. The pilot reliability depends on many varied factors like attention and emotional stability. The 'fiziolog-M' evaluates these factors. This apparatus records the most informative physiologic function indicators like: heart rate (HR), respiration rate (RR); respiratory volume per minute (RVM) and attention reserve (AR) in pilots while exercising in pilot trainers. The attention reserve is a quantitative description of the pilot's capability to receive and process additional information as he performs a primary activity.
E.A.K.

N83-34569# Army Medical Intelligence and Information Agency, Washington, D. C.
MILITARY MEDICAL JOURNAL, NO. 1, JANUARY 1983
23 May 1983 120 p refs Transl. into ENGLISH of Voenno-Med. Zh. (Moscow), no. 1, Jan. 1983
(L-2292) Avail: NTIS HC A06/MF A01

Research and progress in soviet aerospace medicine was reported. Topics discussed include: improved medical support and services for the military; education of medical personnel; radiation sickness and treatment of victims during evacuation; functions of immune system during normal and pathologic conditions; diagnosis and treatment of acute cholocystitis; oxygen enrichment of air for anesthesiology and resuscitation; intermittent affect of low temperatures on human organisms; changes in protein metabolism in low temperatures; medical support in flight safety; human behavior; psychological effects. For individual titles, see N83-34570 through N83-34572.

N83-34570# Army Medical Intelligence and Information Agency, Washington, D. C.
RESULTS OF STUDIES OF THE INTERMITTENT EFFECT OF LOW TEMPERATURE ON THE HUMAN ORGANISM
V. P. Kovalenko and V. V. Pastukhov *In its* Mil. Med. J., No. 1, Jan. 1983 (L-2292) 23 May 1983 p 65-68 Transl. into ENGLISH from Voenno-Med. Zh. (Moscow), no. 1, Jan. 1983 (For primary document see N83-34569 22-52)
Avail: NTIS HC A06/MF A01

The effect of intermittent low temperature on the thermal state of the organism was studied in a climate chamber. The dynamics of changes of the thermal status of the organism are presented. It is indicated that as the length of interruptions between exposures to cold increases, the resistance of the organism to repeated chilling increases. It is found, however that repeated exposure to cold results in a decrease in thermal status indicators to lower levels than in the initial cold exposure. It is found that in spite of the increased skin temperature and as a result of this moderate rise in mean body temperature full compensation for cooling of the deeper layers, was not achieved by the end of the recovery period. It is suggested that the fact that before recooling the rectal temperature was 0.6 C lower than the background level could be the factor for the lower sensitivity of the organism to repeated exposure to cold.
E.A.K.

N83-34571# Army Medical Intelligence and Information Agency, Washington, D. C.
CHANGES IN PROTEIN METABOLISM DURING ACCLIMATIZATION IN THE ARCTIC
A. A. Shabarov and N. T. Svistunov *In its* Mil. Med. J., No. 1, Jan. 1983 (L-2292) 23 May 1983 p 69-73 refs Transl. into ENGLISH from Voenno-Med. Zh. (Moscow), no. 1, Jan. 1983 (For primary document see N83-34569 22-52)
Avail: NTIS HC A06/MF A01

Natural conditions in the North were studied and showed that long term exposure to unfavorable environmental factors causes a drop in the quantity of total protein and albumins, a relative increase in the level of blood serum globulins, a change in the spatial positioning of protein molecules and their reactive groups. These changes are manifested within 1 to 2 months and remain permanently in all persons regardless of the time they live in the North. It was also shown that adaptation to polar conditions is accompanied by an increase in the quantity of total protein and albumins, a decrease in the content of gamma globulins in the blood serum. The nature of changes in protein metabolism among civilians in the process of acclimatization to Arctic conditions was studied.
E.A.K.

N83-34572# Army Medical Intelligence and Information Agency, Washington, D. C.
EXPERIENCES IN ORGANIZING MEDICAL SUPPORT OF FLIGHT SAFETY
S. A. Vartanov and A. F. Pakhomov *In its* Mil. Med. J., No. 1, Jan. 1983 (L-2292) 23 May 1983 p 74-76 refs Transl. into ENGLISH from Voenno-Med. Zh. (Moscow), no. 1, Jan. 1983 (For primary document see N83-34569 22-52)
Avail: NTIS HC A06/MF A01

The health of the pilot before the flight and his psychological readiness are increasingly significant are discussed. The main tasks of the medical service in aviation are prevention of flying accidents due to possible reduced working capacity of the crew in flight, to preserve good health and high physical endurance of pilots, and to increase the time of service on flight duty. The improvement of the modern combined system of the medical sessions during flights, improvement of methods of utilization of the 'Fiziolog-M' apparatus, expansion of the volume of preflight medical testing are recommended. Piloting modern supersonic aircraft may cause emotional stress, the degree of which depends not only on the difficulty and conditions of performance of the mission, but also

on the degree of restoration of the mental and physical capacity of the pilot's organism between flights. The improvement of existing methods of recovery of pilots' working capacity, increasing readiness for repeated activity are outlined. E.A.K.

N83-34573# Civil Aeromedical Inst., Oklahoma City, Okla.
SOME EFFECTS OF SMOKING WITHDRAWAL ON COMPLEX PERFORMANCE AND PHYSIOLOGICAL RESPONSES
Henry W. Mertens, Jess M. McKenzie, and E. Arnold Higgins Jan. 1983 16 p refs
(AD-A126551; FAA-AM-83-4) Avail: NTIS HC A02/MF A01 CSCL 06/19

The effects of smoking withdrawl on complex (time-shared) performance and physiological responses were studied at a simulated aircraft cabin altitude of 6,500 ft. Seventeen habitual smokers, nine women and eight men 23 to 59 years of age, served as subjects. Time-shared performance of monitoring, tracking, mental arithmetic, and problem solving tasks was measured by the Civil Aeromedical Institute (CAMI) Multiple Task Performance Battery (MTPB) in two 4-h test sessions, one in which smoking was permitted at 1/2-h intervals and a no-smoking session. Corollary physiological measurements involved urinary hormones (epinephrine, norepinephrine, and 17-ketogenic steroids), carboxyhemoglobin levels (COHb), and heart rate (HR). Overall composite scores for MTPB performance revealed decrements during withdrawal which were statistically significant ($p < .01$) beginning at the third 1/2-h period of withdrawal sessions. The principal sources of the withdrawal effect were a significant $p < .05$) decrement in tracking and a tendency toward longer reaction times in one monitoring task during withdrawal. These performance decrements were associated with significantly lower HR ($p < .05$) ratings of attentiveness during withdrawal from smoking. B.W.

N83-34574# Ohio State Univ., Columbus. Dept. of Veterinary Pathobiology.
MOLECULAR INTERACTIONS OF HIGH ENERGY FUELS AND JET FUELS WITH ONCOGENIC VIRUSES AND ENDOGENEOUS VIRUSES. Progress Report, 31 Jul. 1981 -31 Dec. 1982
James R. Blakeslee Feb. 1983 58 p refs
(Contract F49620-80 C-0087; AF Proj. 6110)
(AD-A126410; AFOSR-83-0139TR) Avail: NTIS HC A04/MF A01 CSCL 06/2

Rapid in vitro assays to evaluate toxicologic and carcinogenic potential of chemicals used in world-wide U.S. Air Force operation were developed. The effect diverse chemicals have on a feline sarcoma virus transformation of human cells was investigated. Carcinogenic potential with gene expression of an endogenous feline virus (RD-114) was investigated. To date, carcinogens increase expression (ng virus protein/mg cellular protein) in a time and dose-dependent manner. Author

N83-34575# Los Alamos Scientific Lab., N. Mex.
TOXICOLOGICAL STUDY OF THE HIGH EXPLOSIVE FORMULATION X-0298
J. E. London and D. M. Smith Jan. 1983 5 p refs
(Contract W-7405-eng-36)
(DE83-007124; LA-9628-MS) Avail: NTIS HC A02/MF A01

The acute oral LD50 values for the high explosive formulation X-0298 for mice and rats is greater than 5 g/kg. According to classical guidelines, the mixture would be considered only slightly or practically nontoxic in both species. Skin application studies in the rabbit with X-0298 demonstrated that it was cutaneously nonirritating. This material was also nonirritating in rabbit eye application studies. The sensitization study in the guinea pig did not show X-0298 to be deleterious in this regard. DOE

N83-34576# Argonne National Lab., Ill. Div. of Biological and Medical Research.
PROJECTION MODELS FOR HEALTH-EFFECTS ASSESSMENT IN POPULATIONS EXPOSED TO RADIOACTIVE AND NONRADIOACTIVE POLLUTANTS. VOLUME 1: INTRODUCTION TO THE SPAHR DEMOGRAPHIC MODEL FOR HEALTH RISK
James J. Collins, Robert T. Lundy, Douglas Grahn, and Michael E. Ginevan Sep. 1982 89 p refs 5 Vol.
(Contract W-31-109-eng-38)
(DE83-001021; NUREG/CR-2364-Vol-1; ANL-81-59-Vol-1) Avail: NTIS HC A05/MF A01

The Simulation Package for the Analysis of Health Risk (SPAHR) is a computer software package based upon a demongraphic model for health risk projections. The model extends several health risk projection models by making realistic assumptions about the population at risk, and thus represents a distinct improvement over previous models. Complete documentation for use of SPAHR is contained in this five-volume publication. The demographic model is SPAHR estimates population response to environmental toxic exposures. Latency of response, changing dose level over time, competing risk from other causes of death, and population structure can be incorporated into SPAHR to project health risks. Risks are measured by morbid years, number of deaths, and loss of life expectancy. Comparisons of estimates of excess deaths demonstrate that previous health risk projection models may have underestimated excess deaths by a factor of from 2 to 10, depending on the pollutant and the exposure scenario. DOE

N83-34577# Tennessee Valley Authority, Muscle Shoals, Ala. Div. of Occupational Health and Safety.
A COMPARISON OF THE RADIOLOGICAL DOSES TO MAN PREDICTED BY THE UDAD AND UMMAC ASSESSMENT CODES
Jesse H. Coleman and Jeanie L. Polehn Jun. 1982 16 p
(DE83-900062; TVA/OMS/RHS-82/2) Avail: NTIS HC A02/MF A01

Several computer codes that estimate environmental dose to man from uranium mining and milling operations are in existence. An analysis of two environmental dose to man analyses performed on the same mill-receptor example by the UMMAC and UDAD codes is presented. It is concerned with a comparison of the dose to man predictions of the codes rather than with the codes themselves. DOE

N83-34578# Sheffield Univ. (England). Dept. of Control Engineering.
SPECTRAL ANALYSIS OF SHORT-TIME BIOMEDICAL DATA USING ADAPTIVE FILTERS
J. Braham Levy and D. A. Linkens Apr. 1983 30 p refs
(RR-218) Avail: NTIS HC A03/MF A01

The least mean squares gradient search method was used to provide real-time analysis of biomedical data from the human gastrointestinal tract and from processed ECG signals providing heart rate variability (HRV) time series. The microprocessor based computing and results display system is described. Suggested uses include detection of migrating myoelectrical complexes in the stomach, the study of thermoregulatory and other influences on HRV, and for monitoring the progress of Reynaud's disease during treatment. Author (ESA)

N83-34542# Joint Publications Research Service, Arlington, Va.
ALL-UNION CONFERENCE ON PROBLEMS OF COMPREHENSIVE STUDY OF MAN HELD
In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 40 (JPRS-84246) 2 Sep. 1983 p 38-42 Transl. into ENGLISH from APN Daily Rev. (USSR), 11 May 1983 p 1-6 (For primary document see N83-34539 22-51)
Copyright. Avail: NTIS HC A06

N83-34549# Joint Publications Research Service, Arlington, Va.
HYGIENIC EVALUATION OF 8-MM WAVE ELECTROMAGNETIC FIELDS
Yu. D. Kumanskiy and L. A. Tomashevskaya *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 6-9 refs Transl. into ENGLISH from Gig. Sanit. (USSR), no. 6, Jun. 1982 p 18-20 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

N83-34551# Joint Publications Research Service, Arlington, Va.
DESTRUCTIVE AND REPARATIVE PROCESSES IN HIP-

POCAMPUS WITH LONG-TERM EXPOSURE TO NONIONIZING MICROWAVE RADIATION
V. S. Belokrinitskiy *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 15-20 refs Transl. into ENGLISH from Byull. Eksp. Biol. Med. (USSR), v. 93, no. 3, Mar. 1982 p 89-92 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

N83-34552# Joint Publications Research Service, Arlington, Va.
CLINICAL ASPECTS OF EFFECTS OF VARIABLE MAGNETIC FIELDS ON POSTOPERATIVE COMPLICATIONS
A. A. Verzin and L. N. Kolesnikova *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 1-5 refs Transl. into ENGLISH from Vestn. Oftalmol. (USSR), no. 3, May-Jun. 1982 p 56-57 Previously announced as A82-46837 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

N83-34553# Joint Publications Research Service, Arlington, Va.
CHANGES IN NERVOUS SYSTEM OF INDIVIDUALS EXPOSED TO MICRORADIOWAVES FOR LONG PERIOD OF TIME
I. N. Gorbach *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 24-28 refs Transl. into ENGLISH from Zdravookhr. Beloruss. (USSR), no. 5, May 1982 p 51-53 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

N83-34554# Joint Publications Research Service, Arlington, Va.
ARGON LASER USED FOR TREATMENT OF PATIENTS WITH SEVERE FORMS OF HERPETIC KERATITIS
T. I. Yeroshevskiy, V. M. Petukhov, and V. Yu. Kulagain *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 29-31 refs Transl. into ENGLISH from Vestn. Oftalmol. (USSR), no. 3, May-Jun. 1982 p 33-34 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

N83-34555# Joint Publications Research Service, Arlington, Va.
LASER SURGERY FOR NEOPLASMS OF THE CONJUNCTIVA AND EYELIDS
G. I. Osipov *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 7 (JPRS-81865) 27 Sep. 1982 p 32-34 refs Transl. into ENGLISH from Vestn. Oftalmol. (USSR), no. 3, May-Jun. 1982 p 51-53 (For primary document see N83-34547 22-51)
Avail: NTIS HC A03/MF A01

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N83-34579*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECT OF LOW-FREQUENCY TONES AND TURBULENT-BOUNDARY-LAYER NOISE ON ANNOYANCE
Kevin P. Shepherd (Bionetics Corp., Hampton, Va.), Jack D. Leatherwood, and Sherman A. Clevenson Sep. 1983 27 p refs (NASA-TP-2202; L-15628; NAS 1.21:2202) Avail: NTIS HC A03/MF A01 CSCL 05I

A laboratory study was conducted to examine annoyance to combinations of low-frequency tones and turbulent-boundary-layer noise. A total of 240 sounds, containing tones in the range from 80 to 315 Hz, were rated by 108 test subjects in an anechoic chamber. The results indicated that tone penalties (defines as the failure of a noise metric to account for the presence of pure tones) are highly dependent on the choice of noise metric. A-weighted sound pressure level underpredicted annoyance by as much as the equivalent of 5 db and unweighted sound pressure level overpredicted by as much as the equivalent of db. Tone penalties were observed to be dependent on the shape of the turbulent boundary-layer noise spectrum. Author

N83-34580*# Columbia Univ., New York. Psychophysics Lab.
BEHAVIORAL INDICATORS OF PILOT WORKLOAD
Eugene Galanter and Julian Hochberg 1 May 1983 12 p refs Presented at the 2nd Symp. on Aviation Psychol., Columbus, Ohio, 26 Apr. 1983 Submitted for publication
(Contract NCC1-5)
(NASA-CR-173033; NAS 1.26:173033; PPL-83/4) Avail: NTIS HC A02/MF A01 CSCL 05I

Using a technique that requires a subject to consult an imagined or remembered spatial array while performing a visual task, a reliable reduction in the number of directed eye movements that are available for the acquisition of visual information is shown. Author

N83-34581# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
REAL-TIME MONITORING OF THE VISUAL EVOKED POTENTIAL Interim Report
J. G. Nelson and L. Hrebien Jul. 1982 12 p refs
(AD-A126686; NADC-82205-60) Avail: NTIS HC A02/MF A01 CSCL 05/10

Subjects can experience loss of consciousness (LOC) during exposure to sufficiently high +Gz acceleration. LOC is usually preceeded by decreased visual sensitivity, dimming of the visual field, peripheral light loss (PLL) and central light loss. Real-time monitoring of PLL as a measure of +Gz tolerance on the human centrifuge presently requires an active response by the subject. In contrast, the visual evoked potential (VEP) also reflects the integrity of the visual system and requires only the passive response of viewing a visual stimulus. (4) A preliminary evaluation of the Steady-state VEP for real-time monitoring of visual functioning was accomplished with a computer controlled dual-channel Fast Fourier Transform (FFT) signal analyzer. Since significant degradation of visual functioning must be recognized in less than approximately four seconds, we required a previously unattained efficiency in producing and measuring the VEP. Using the Coherence Function (1) and the expectation for the variance of a weighted sum of variables (2) analytic methods and instrumentation were developed for reducing the results of the FFT processing to a unidimensional measures, having a known and maximal signal-to-noise ratio, with measures available at 1 1/2 second intervals. B.W.

N83-34582# New Mexico State Univ., Las Cruces. Behavioral Engineering Lab.
HUMAN FACTORS AFFECTING PILOT PERFORMANCE IN VERTICAL AND TRANSLATIONAL INSTRUMENT FLIGHT Interim Scientific Report, 1 Jan. - 31 Dec. 1982
Stanley N. Roscoe and Louis Corl Dec. 1982 34 p refs
(Contract N00014-81-K-0439)
(AD-A128204; BEL-82-2/ONR-82-2) Avail: NTIS HC A03/MF A01 CSCL 05/5

A conceptual analysis and review of human factors problems in piloting VTOL aircraft including helicopters is presented. VTOL mission and flight requirements are contrasted with those of CTOLs. Deficiencies in present VTOL flight instrumentation are summarized. An experimental approach that is based on established display principles and emphasizes dynamically predictive skeletal,perspective, vertical and horizontal situation displays is presented. GRA

N83-34583# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Human Factors and Life Support Working Group.
NEUROPHYSIOLOGICAL MEASURES OF A-10 WORKLOAD DURING SIMULATED LOW ALTITUDE MISSIONS
Glenn F. Wilson (Wittenberg Univ.), Robert D. O'Donnell, and Lawrence Wilson Dec. 1982 34 p refs
(AF Proj. 7184)
(AD-A128184; AFAMRL-TR-83-0003) Avail: NTIS

HC A03/MF A01 CSCL 05/5

Eye movements and evoked responses were used to test pilots' reactions to emergency conditions while flying simulated A-10 missions. Two types of stick jam or other minor emergencies occurred during a pull up maneuver. Oculometer and behavioral data were collected to measure the pilots' responses to these situations. Evoked responses to single tones that were presented one second after the onset of each emergency were used to assess whether or not the pilots were yet aware of the presence of the emergency. The oculometer data showed that the pilots very efficiently responded to the emergencies with a few appropriately directed eye movements. The correct indicators and response areas were looked at and the proper responses to correct the emergency were rapidly made. The evoked response data supported the oculometer data. Movement artifacts during the evoked response analysis epochs indicated that the pilots quickly detected the emergency situations, in many cases this happened so fast the they were moving by the time the tone probe was presented. Subjective questionnaire data showed that the pilots ranked the jam conditions as more difficult to deal with than the minor emergencies. The pilots also felt confident that they could handle the situations that occurred. Author (GRA)

N83-34584# Performance Measurement Associates, Inc., Vienna, Va.

AN ANALYTICAL MODEL FOR DEVELOPING OBJECTIVE MEASURES OF AIR CREW PROFICIENCY WITH MULTIVARIATE TIME SEQUENCED DATA. VOLUME 1: ANALYSIS AND RESULTS Final Report, Jan. 1980 - May 1981

Edward M. Connelly, Pamela Johnson, and Brian D. Shipley, Jr. (Army Research Inst.) Alexandria, Va. ARI May 1981 131 p refs 2 Vol.

(Contract MDA903-80-C-0198; DA Proj. 2Q1-62717-A-790)

(AD-A128070; ARI-RN-81-16-VOL-1) Avail: NTIS HC A07/MF A01 CSCL 05/9

This report represents a theoretical investigation of analytic methods for deriving differential weighting functions from preselected samples of multivariate, time sequenced observations of aircrew performance. The research effort resulted in an analytic model which could be used to prepare and to further investigate differential weighting functions as a means of establishing relationships between time sequenced observations of aircrew performance and independent assessments of aircrew proficiency. A companion report, Volume II. Computer Program Documentation (RN 81-17), provides documentation of the basic computer programs used in the processor termed 'Measurement Analysis Processor' (MAP). Author (GRA)

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N83-34585*# George Mason Univ., Fairfax, Va. Decision Sciences Faculty.

A HUMAN FACTORS METHODOLOGY FOR REAL-TIME SUPPORT APPLICATIONS

Elizabeth D. Murphy, Paula M. VanBalen, and Christine M. Mitchell Jan. 1983 62 p refs

(Contract NAS5-26952)

(NASA-CR-170581; NAS 1.26:170581) Avail: NTIS HC A04/MF A01 CSCL 05H

A general approach to the human factors (HF) analysis of new or existing projects at NASA/Goddard is delineated. Because the methodology evolved from HF evaluations of the Mission Planning Terminal (MPT) and the Earth Radiation Budget Satellite Mission Operations Room (ERBS MOR), it is directed specifically to the HF analysis of real-time support applications. Major topics included for discussion are the process of establishing a working relationship between the Human Factors Group (HFG) and the project, orientation of HF analysts to the project, human factors analysis and review, and coordination with major cycles of system development. Sub-topics include specific areas for analysis and appropriate HF tools. Management support functions are outlined. References provide a guide to sources of further information. Author

N83-34586# Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.

POSITION SENSING WRISTS FOR INDUSTRIAL MANIPULATORS

Mark R. Cutkosky and Paul K. Wright 15 Jul. 1982 19 p refs Sponsored in part by Westinghouse Corp.

(AD-A126402; CMU-RI-TR-82-9) Avail: NTIS HC A02/MF A01 CSCL 13/9

A new wrist design for an industrial manipulator is described that exhibits range of compliant control. This is necessary for large industrial robots that experience a range of tool-lengths and pay-loads. The device has five and a half degrees of freedom and is structurally similar to a previous design by McCallion. Reinforced clastomeric spheres are used in the compliant platform of the unit. These display a monotonically increasing spring stiffness and can be adjusted using a pressurized fluid. Deflections in the wrist are measured using LVDT transducers. A dedicated microcomputer monitors the deflections and modifies robot sequences to correct for long-term errors in repetitive tasks. Author

N83-34587# Machine Intelligence Corp., Sunnyvale, Calif.

BINARY COLOR VISION FOR INDUSTRIAL AUTOMATION Final Report, 1 Apr. - 31 Dec. 1982

David Milgram and Michael Chen 28 Feb. 1983 45 p refs

(Contract F49620-82-C0069; AF Proj. 2305)

(AD-126409; AFOSR-83-0142TR) Avail: NTIS HC A03/MF A01 CSCL 20/6

The questions of the near-term utilization of color by existing state-of-the-art binary vision systems are addressed. Using the experimental testbed, it was demonstrated that under suitable thresholding and filtering, the spectral contents of color scenes could be artificially controlled. Rejection of unwanted colors or background clutter could be performed. Under single threshold selection, discriminations of objects identical in shapes and sizes but different in colors could be achieved by utilizing the luminance effect of colors. Color encoding combines the description of colors and thresholding and provides a simple interface to computer processing. Author

N83-34588# Carnegie-Mellon Univ., Pittsburgh, Pa. Inst. for Robotics.

KBS: AN ARTIFICIAL INTELLIGENCE APPROACH TO FLEXIBLE SIMULATION Interim Report

Y. V. Reddy and Mark S. Fox 14 Sep. 1982 37 p refs Revision Sponsored in part by the Westinghouse Corp.

(AD-A126413; CMU-RI-T-82-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

A knowledge-based simulation (KBS) system is described. The use of SRL, an AI-based knowledge representation system for modelling and its interpretation for discrete simulations are described. KBS provides facilities for interactive model creation and alteration, simulation monitoring and control, graphics display and selective instrumentation. It also allows the users to define and simulate a system of different levels of abstraction, and to check the completeness and consistency of a model, hence reducing model debugging time. Author

N83-34589# Defence Research Establishment, Ottawa. (Ontario). Protective Sciences Div.

WICKING ABILITY, WATER ABSORPTION, AND THERMAL RESISTANCE OF SEVERAL THERMAL UNDERGARMENT FABRICS

Patricia A. Dolhan Mar. 1982 15 p refs

(AD-A128101; DREO-TN-82-12) Avail: NTIS HC A02/MF A01 CSCL 15/5

In response to a request from DCGEM eight different undergarment materials were evaluated to determine the properties of thermal resistance, the ability to wick, and to adsorb water. It is not possible from the tests performed to rate one undergarment sample as much better than the rest in all characteristics. One sample (a plain knit fabric of 100% polypropylene) exhibited the greatest ability to wick, and the greatest amount of water absorbed. The thermal resistance of all the undergarments is quite small as compared to an Arctic clothing assembly. Of the undergarments measured, a honeycomb knit of 100% cotton had a slightly higher thermal resistance. The relative importance of these properties depends upon the environment, the characteristics of other components of the clothing ensemble and the tasks to be performed by the person wearing the garments. Author (GRA)

N83-34590# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
MANIPULATOR GRASPING AND PUSHING OPERATIONS Ph.D. Thesis
Matthew Thomas Mason 21 May 1982 140 p refs
(Contracts N00014-81-K-0491; N00014-77-C-0389; N00014-80-C-0505)
(AD-A128438; AI-TR-690) Avail: NTIS HC A07/MF A01 CSCL 50/1

The primary goal of this research is to develop theoretical tools for analysis, synthesis, and application of primitive manipulator operations. The primary method is to extend an apply traditional tools of classical mechanics. The results are of such a general nature that they address many different aspects of industrial robotics, including effector and sensor design, planning and programming tools, and design of auxiliary equipment. Some of the manipulator operations studied are: Grasping an object: The object will usually slide and rotate during the period between first contact and prehension; Placing an object: The object may slip slightly in the fingers upon contact with the table as the base aligns with the table; and Pushing: Often the final stage of mating two parts involves pushing one object into the other. In each of these operations the motion of the object is determined partly by the manipulator and partly by frictional forces. Hence the theoretical analysis focuses on the problem of partially constrained motion with friction. GRA

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N83-34591*# Boeing Computer Services, Inc., Seattle, Wash. Energy Technology Applications Div.
CORRECTION AND IMPROVEMENT OF CARE 3: VERSION 3 Interim Report
D. M. Rose, J. W. Manke, R. E. Altschul, and D. L. Nelson Apr. 1983 78 p refs
(Contract NAS1-16900)
(NASA-CR-166122; NAS 1.26:166122) Avail: NTIS HC A05/MF A01 CSCL 12A

Calculation of b sub x, y; system fault tree analysis; subroutine analysis, and transient faults are addressed. Author

N83-34592# National Engineering Lab., East Kilbride (Scotland). Engineering Metrology Business Centre.
THE GENERATION AND ANALYSIS OF CONTOUR FRINGES-BASIC PRINCIPLES
G. T. Reid Apr. 1983 23 p refs Sponsored by UK Dept. of Industry's Metrology and Standards Requirements Board
(NEL-684; ISSN-0305-1439) Avail: NTIS HC A02/MF A01

An automatic method for the measurement of complex shapes is described. The measurement relies on a heterodyne version of projected moire contouring. Although the optical system does not in itself produce a linear relationship between height and contour fringe phase, the relationship between the two quantities is clearly defined and readily allows the determination of surface coordinates. To verify the analysis, data were gathered manually from an optically processed image of a simple object and the acquired data were computer processed to yield an engineering drawing of the object. Author (ESA)

N83-34593# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Electronique et Physique.
STUDY AND DEVELOPMENT OF A CAD PROGRAM FOR ASYMMETRIC MIXERS WITH SCHOTTKY DIODES Ph.D. Thesis [ETUDE ET DEVELOPPMENT D'UN PROGRAMME DE CAO DES MELANGEURS ASYMETRIQUES A DIODE SCHOTTKY]
Mamiharilala Rasolojaona 15 Jun. 1983 246 p refs In FRENCH
(ENST-E-83007) Avail: NTIS HC A11/MF A01

A CAD program for superhigh frequency microstrip mixers which gives conversion losses, noise factor, impedance, and intermodulation products rapidly and with high precision was developed. The theoretical model used is an extension of the Kerr multiple reflection method to incorporate the internal mixer network. Three model S band mixers were used to test the theory. The Kerr method takes 300 iterations to convergence for strong signals, so the voltage update method (200 iterations) is recommended. Extension of the program to mixers with two or more diodes is outlined. Author (ESA)

N83-34594# Oxford Univ. (England). Dept. of Engineering Science.
PID ALGORITHMS AND THEIR COMPUTER IMPLEMENTATION
D. W. Clarke 1983 40 p refs
(OUEL-1482/83) Avail: NTIS HC A03/MF A01

Positional, incremental, and cascade PID algorithms and their closed-loop properties are discussed. Avoidance of integral windup and derivative kick is described. Ways in which the PID algorithm can be discretized for use in a digital computer are outlined, together with appropriate FORTRAN coding. The effect of choice of sample interval on the discretized performance is analyzed. Often the interval is chosen to be as short as possible given the computational power available; the influence of this on quantization noise and offset is discussed. The properties of the anti-aliasing filter and a filter on derivative action are investigated. Nonlinear filters, including spike filters, are presented.
Author (ESA)

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering.*

N83-34595 Royal Signals and Radar Establishment, Malvern (England).
A PORTABLE INPUT/OUTPUT PACKAGE FOR CORAL BASED 8080 SYSTEMS
M. P. Griffiths May 1983 22 p refs
(RSRE-Memo-3589; BR88546) Copyright. Avail: Issuing Activity

Procedures for use with the RCC80 Coral compiler, which enable user programs to access the host operating system and transform integer and floating point numbers to and from ASCII strings and their binary representations are presented. The structure

of the library is described, showing how the procedures can be transported onto a new hardware configuration. Author (ESA)

N83-34596*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
CHIP LEVEL SIMULATION OF FAULT TOLERANT COMPUTERS Final Report, 1 Jun. 1981 - 31 May 1983
J. R. Armstrong 1983 18 p
(Grant NAG1-174)
(NASA-CR-173027; NAS 1.26:173027) Avail: NTIS HC A02/MF A01 CSCL 09B

Chip level modeling techniques, functional fault simulation, simulation software development, a more efficient, high level version of GSP, and a parallel architecture for functional simulation are discussed. Author

N83-34597*# Kentron International, Inc., Hampton, Va.
A PERFORMANCE ANALYSIS OF THE PASLIB VERSION 2.1X SEND AND RECV ROUTINES ON THE FINITE ELEMENT MACHINE
J. D. Knott Aug. 1983 34 p refs
(Contract NAS1-16000)
(NASA-CR-172205; NAS 1.26:172205) Avail: NTIS HC A03/MF A01 CSCL 09B

The Finite Element Machine is an experimental array processor designed to support research in parallel algorithms and architectures. This report presents a case study of communications using the SEND and RECV system software routines on the Finite Element Machine, followed by a discussion of the effect of I/O performance on the efficiency of parallel algorithms. Author

N83-34598# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Support Systems Branch.
MULTIPROCESSOR SHARED MEMORY (MSM) DEVELOPMENT Final Report, May 1979 - Nov. 1982
Jahn A. Luke Jan. 1983 13 p refs
(AD-A126527; AFWAL-TR-83-1024-Vol-1) Avail: NTIS HC A02/MF A01 CSCL 09/2

The developmental aspects of the multiprocessor shared memory (MSM) are outlined. The development of the MSM device was based on the requirement for a faster transfer of data between the DECsystem-10 mainframe computer and the satellite PDP-11 minicomputers during real-time simulations. The existing DMA10 (direct access memory device) was too slow in handling simultaneous simulations, or a real-time simulation and file transfer program running concurrently. A general description of the MSM prototype and its specifications is given. Author

N83-34599# IBM Research Lab., San Jose, Calif.
AN ENGINEERING STUDY OF OPTICAL MEMORIES BASED ON PHOTOCHEMICAL HOLE BURNING Final Report
G. C. Bjorklund 22 Mar. 1983 24 p refs
(Contract N00014-81-C-0165; NR Proj. 421-001)
(AD-A126419) Avail: NTIS HC A02/MF A01 CSCL 09/2

The utility of FM spectroscopy for rapid and sensitive detection of photochemical holes was conclusively demonstrated, aggregate color centers in alkali halide crystals were identified as suitable photochemical hole burning (PHB) recording materials for exploratory work on memory applications, technically reasonable PHB memory systems configurations were devised for DASD-type applications, PHB materials sensitive to GaAlAs laser wavelengths were discovered, satisfactory GaAlAs laser tuning was achieved, and reading and writing of holes using GaAlAs diode lasers was explicitly demonstrated. Author

N83-34600# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON SOME APPLICATIONS OF MICROCOMPUTERS IN TELEINFORMATICS
Janusz W. Sowinski 2 Mar. 1983 17 p Transl. into ENGLISH of Informatyka (Poland), v. 18, no. 12, 1978 p 4-7
(AD-A128095; FTD-ID(RS)T-1575-82) Avail: NTIS HC A02/MF A01 CSCL 09/2

The place and role of microprocessors and microcomputers in teleinformatics equipment and systems are outlined. Selected applications are discussed, and the architecture and characteristic features of microcomputers are presented in the context of the data transmission. Author

N83-34601# Honeywell Systems and Research Center, Minneapolis, Minn.
CCD MATRIX PROCESSOR Final Technical Report, 25 Aug. 1980 - 1 Mar. 1982
P. C. T. Roberts, J. D. Joseph, J. A. Hoschette, R. Fitch, B. R. Hanzal, and D. B. Yanke Apr. 1983 231 p refs
(Contract F19628-80-C-0154; AF Proj. 2305)
(AD-A128643; HONEYWELL-82SRC59; RADC-TR-82-294) Avail: NTIS HC A11/MF A01 CSCL 09/2

A new CCD Matrix Array has been fabricated including a Microprocessor Host-CPU and Controller Exerciser Electronics Unit. Each unit cell of the array performs analog arithmetic and logic operations on input data matrix elements in the Single Instruction Multiple Data architecture. Ultra-high signal and image processing throughput is demonstrated. Author (GRA)

N83-34602# Materials Research Labs., Melbourne (Australia).
IMPROVING THE ANALYSIS OF SPECTRAL TRANSMISSION RECORDS BY USING A MICROPROCESSOR CONTROLLED DIGITISER
S. Spencer and J. Masinskas Aug. 1982 11 p refs
(MRL-TN-465; AR-003-046) Avail: NTIS HC A02/MF A01

During the development of screening compositions for camouflage purposes, the absorption characteristics of candidate material must be measured over a wide spectral range. This report describes an efficient method to analyze the experimental spectral transmission data obtained during such development work using the Calcomp digitizer and an LSI-11 microcomputer. Author

N83-34603# California Univ., Livermore. Lawrence Livermore Lab.
CONCEPTUAL BASIS FOR DEFENSE APPLICATIONS OF SUPERCOMPUTERS
L. L. Wood 11 Mar. 1983 8 p
(Contract W-7405-eng-48)
(DE83-010121; UCID-19746) Avail: NTIS HC A02/MF A01

The aggressive use of battlefield robotics, utilizing integrated state-of-the-art supercomputing digital processing to perform target acquisition and weapon delivery, is discussed as a method to increase military force effectiveness. DOE

N83-34604# California Univ., Livermore. Lawrence Livermore Lab.
ALGORITHM PARTITIONING TOOLS FOR A HIGH-PERFORMANCE MULTIPROCESSOR Ph.D. Thesis
E. J. Gilbert Dec. 1982 125 p refs
(Contract W-7405-eng-48)
(DE83-010263; UCRL-53401) Avail: NTIS HC A06/MF A01

Partitioning is the process of formulating a single application program so that it runs on a system of multiple cooperating processors. When cooperating in this fashion, the processors share the computational work of the problem. This dissertation investigates tools which a programmer may use to simplify the partitioning of algorithms for effective execution on a high-performance multiprocessor. The motivation for partitioning assumed is simple decrease in overall execution time, i.e., multiprocessor speedup of the algorithm. Focus is provided by emphasis on the structure of a particular system currently under construction, the S-1 multiproccessor. The S-1 consists of 16 very high-performance general-purpose uniprocessors connected to a uniformly addressed, fully shared memory. A large number of mechanisms, techniques, and environments are included in the set of tools useful in constructing a partitioned algorithm. The tools proposed in this dissertation have been successfully applied to the task of partitioning a number of sample programs. DOE

N83-34605# California Univ., Livermore. Lawrence Livermore Lab.
THE TIS INTELLIGENT GATEWAY COMPUTER: AN ALTERNATIVE TO THE DOOMSDAY SCENARIO
Richard K. Hunt, H. Leonard Fisher, Viktor E. Hampel, Richard A. Kawin, and Neil A. Lann 1 Feb. 1983 13 p refs Presented at the 4th Natl. ONLINE Meeting, New York, 12-14 Apr. 1982
(Contract W-7405-eng-48)
(DE83-008599; UCRL-88784; CONF-8204124-1) Avail: NTIS HC A02/MF A01

Work experience is described in the Technical Information Department (TID) with the Technology Information System (TIS) at the Lawrence Livermore National Laboratory (LLNL). Contrary to the Doomsday Scenario postulated for information workers by Dennis A. Lewis, it was found that physicists, chemists, biologists, and engineers in highly computer-oriented work environments show interest in conducting their own searches occasionally, but prefer the information specialist to provide the routine and complex searches required for their programmatic, interdisciplinary work. Requests for information now include also factual data and retrieved from several different sources, some of which are overseas. To respond in a timely manner, the Intelligent Gateway Computer (IGC) facilities of TIS are utilized. They permit automated access of major information centers world-wide, downloading, and post-processing of retrieved results, where permissible. Postprocessing includes text analysis, and graphical display of statistical interpretations. DOE

N83-34606# Argonne National Lab., Ill. Mathematics and Computer Science Div.
LOGIC MACHINE ARCHITECTURE INFERENCE MECHANISMS: LAYER 2 USER REFERENCE MANUAL
Ewing L. Lusk and Ross A. Overbeek Dec. 1982 120 p refs
(Contract W-31-109-eng-38; Grant NSF MCS-79-03870)
(DE83-009467; ANL-82-84) Avail: NTIS HC A06/MF A01

Logic Machine Architecture (LMA) is a package of software tools for the construction of inference-based systems. The reference manual for layer 2 of LMA is presented. It contains the information necessary to write LMA-based systems at the level of layer 3. Such systems would include theorem provers, expert system reasoning components, and customized deduction components for a variety of application systems. DOE

N83-34607# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany).
SURVEY OF NEW VECTOR COMPUTERS: THE CRAY 1S FROM CRAY RESEARCH; THE CYBER 205 FROM CDC AND THE PARALLEL COMPUTER FROM ICL - ARCHITECTURE AND PROGRAMMING
Wolfgang Gentzsch Jan. 1982 41 p refs Transl. into ENGLISH of "Ein Ueberblick ueber die Neuen Vektorrechner CRAY-1S von CRAY Research, CYBER-205 von CDC und den Parallelrechner DAP von ICL - Architektur und Programmierung" Rept. FB-82-02, Goettingen, West Germany, Jan. 1982 50 p Original language document was announced as N82-30961
(NASA-CR-172860; NAS 1.26:172860; PB83-176065;
DFVLR-FB-82-02) Avail: NTIS HC A03/MF A01 CSCL 09B

Problems which can arise with vector and parallel computers are discussed in a user oriented context. Emphasis is placed on the algorithms used and the programming techniques adopted. Three recently developed supercomputers are examined and typical application examples are given in CRAY FORTRAN, CYBER 205 FORTRAN and DAP (distributed array processor) FORTRAN. The systems performance is compared. The addition of parts of two N x N arrays is considered. The influence of the architecture on the algorithms and programming language is demonstrated. Numerical analysis of magnetohydrodynamic differential equations by an explicit difference method is illustrated, showing very good results for all three systems. The prognosis for supercomputer development is assessed. GRA

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N83-34608# SHARE, Inc., Chicago, Ill.
THE PL/I PROJECT PROGRAMMING TECHNIQUES LIBRARY, VOLUME 5
15 Aug. 1983 193 p refs
(SSD-329-Vol-5) Copyright. Avail: Issuing Acitivity

Machine independence, PL/1 block structure and scope of names, conversion and expressions, string manipulation in PL/1, list processing, good PL/1 code for controlling the results of numerical calculations, PL/1 in the teleprocessing environment, based storage, PL/1 aggregates, mathematical built-in functions, PL/1 stream I/O, PL/1 compile-time preprocessor, PL/1 traps and pitfalls, PL/1 and FORTRAN, string processing, preprocessor, interlanguage communication, and programming are documented. Author

N83-34609*# Old Dominion Univ., Norfolk, Va. Dept. of Electrical Engineering.
SOFTWARE DEVELOPMENT FOR INFRASOUND MEASUREMENT SYSTEM Final Report, 3 Jan. - 15 May 1983
Camille Khalaf and John W. Stoughton Aug. 1983 63 p
(Contract NAS1-17099)
(NASA-CR-173061; NAS 1.26:173061) Avail: NTIS HC A04/MF A01 CSCL 09B

A software package developed for detection and analysis of infrasounds produced by air turbulence is described. Author

N83-34610*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MINIMIZING INNER PRODUCT DATA DEPENDENCIES IN CONJUGATE GRADIENT ITERATION Final Report
John VanRosendale Jul. 1983 13 p refs
(Contracts NAS1-17070; NAS1-17130)
(NASA-CR-172178; NAS 1.26:172178; Rept-83-36) Avail: NTIS HC A02/MF A01 CSCL 09B

The amount of concurrency available in conjugate gradient iteration is limited by the summations required in the inner product computations. The inner product of two vectors of length N requires time c log(N), if N or more processors are available. This paper describes an algebraic restructuring of the conjugate gradient algorithm which minimizes data dependencies due to inner product calculations. After an initial start up, the new algorithm can perform a conjugate gradient iteration in time c*log(log(N)). Author

N83-34611*# Kentron Technical Center, Hampton, Va.
FEM ARRAY CONTROL SOFTWARE USER'S GUIDE
Judson D. Knott Aug. 1983 62 p
(Contract NAS1-16000)
(NASA-CR-172189; NAS 1.26:172189) Avail: NTIS HC A04/MF A01 CSCL 09B

Finite Element method (FEM) Array Control Software (FACS) is a user-friendly, interactive software package designed to provide a user interface to the FEM. The use of the FACS commands are described. Author

N83-34612*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PARALLEL ARCHITECTURES FOR ITERATIVE METHODS ON ADAPTIVE, BLOCK STRUCTURED GRIDS Final Report
Dennis Gannon and John VanRosendale Mar. 1983 17 p refs
(Contracts NAS1-17070; NAS1-17130; Grant NSF MCS-81-08512)
(NASA-CR-172195; NAS 1.26:172195; Rept-83-39) Avail: NTIS HC A02/MF A01 CSCL 09B

A parallel computer architecture well suited to the solution of partial differential equations in complicated geometries is proposed. Algorithms for partial differential equations contain a great deal of parallelism. But this parallelism can be difficult to exploit, particularly on complex problems. One approach to extraction of

this parallelism is the use of special purpose architectures tuned to a given problem class. The architecture proposed here is tuned to boundary value problems on complex domains. An adaptive elliptic algorithm which maps effectively pnto the proposed architecture is considered in detail. Two levels of parallelism are exploited by the proposed architecture. First, by making use of the freedom one has in grid generation, one can construct grids which are locally regular, permitting a one to one mapping of grids to systolic style processor arrays, at least over small regions. All local parallelism can be extracted by this approach. Second, though there may be a regular global structure to the grids constructed, there will be parallelism at this level. One approach to finding and exploiting this parallelism is to use an architecture having a number of processor clusters connected by a switching network. The use of such a network creates a highly flexible architecture which automatically configures to the problem being solved. Author

N83-34613*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE FEM-2 DESIGN METHOD Final Report
Terrence W. Pratt, Loyce M. Adams, Piyush Mehrotra, John VanRosendale, Robert G. Voigt, and Merrell Patrick Aug. 1983 13 p refs
(Contracts NAS1-17070; NAS1-17130; Grant NSF MCS-78-00763) (NASA-CR-172197; NAS 1.26:172197; Rept-83-41) Avail: NTIS HC A02/MF A01 CSCL 09B

The FEM-2 parallel computer is designed using methods differing from those ordinarily employed in parallel computer design. The major distinguishing aspects are: (1) a top-down rather than bottom-up design process; (2) the design considers the entire system structure in terms of layers of virtual machines; and (3) each layer of virtual machine is defined formally during the design process. The result is a complete hardware/software system design. The basic design method is discussed and the advantages of the method are considered. A status report on the FEM-2 design is included. Author

N83-34614*# Old Dominion Univ., Norfolk, Va. Dept. of Computer Science.
MONITORING AND QUEUING FOR SIFT Final Report, 1 Jan. - 15 May 1983
Larry Wilson Sep. 1983 20 p
(Contract NAS1-17099)
(NASA-CR-173057; NAS 1.26:173057) Avail: NTIS HC A02/MF A01 CSCL 09B

The SIFT instrumentation is called the 'Window.' This window was designed to collect internal data from SIFT while having minimal overhead. Window consists of Sender and Relay components. Sender is to be run on processors 0..5 and Relay will run on processor 6. Sender will gather values (currently 12) during the subframe allocated to a task and broadcast these values at the start of the next subframe. This timing was selected to guarantee Relay 3.2ms to collect and transmit the data. Author

N83-34615# Naval Postgraduate School, Monterey, Calif.
A USER'S MANUAL FOR INTERACTIVE LINEAR CONTROL PROGRAMS ON IBM/3033 M.S. Thesis
Robert M. Tompson Dec. 1982 116 p refs
(AD-A126734) Avail: NTIS HC A06/MF A01 CSCL 09/2

There existed a need for an interactive program that would provide the user assistance in solving applications of linear control theory. The Linear Control Program (LINCON) and its users guide satisfy this need. A series of ten interactive programs are presented which permit the user to carry out analysis, design and simulation of a broad class of linear control problems. Author

N83-34616# University of Southern California, Los Angeles. Information Sciences Inst.
C2 GRAPHICS EDITOR USER'S MANUAL
Dennis Hollingworth Feb. 1983 28 p ref
(Contract MDA903-81-C-0335)
(AD-A126603; ISI/TM-83-24) Avail: NTIS HC A03/MF A01 CSCL 09/2

The C2 Graphics Editor is a graphics language (GL) application program intended to facilitate the creation of graphics files for use by the Briefing Aid and other GL application programs. These graphics files are standard GL device-independent files and may be played back by any GL application program on any GL-supported graphics output device. The editor will run on both TENEX and TOPS-20 machines on which GL is available. The graphics editor consists of an application component linked with a GL frontend, which is bound at run-time to a GL backend. As with any GL application program, it executes either on a single machine or on multiple machines with an ARPANET connection between the application/frontend and the graphics backend. M.G.

N83-34617# Associated Computer Consultants, Santa Barbara, Calif.
THE PROJECT TO DEVELOP HDH HOST TO C-30/IMP PROTOCOL SOFTWARE FOR USE WITH XQ/CP AND UMC Final Report
Harry C. Thornberry 22 Feb. 1983 10 p refs
(Contract MDA903-82-C-0476; DARPA Order 4024)
(AD-A126557) Avail: NTIS HC A02/MF A01 CSCL 09/2

A host interface, designated as HDH, was designed and implemented on C/30 IMPs to support the connection of hosts to the IMP using HDLC at the link level, and the ARPANET host/IMP logical protocol at the network level. This access protocol is general enough to permit any host with an HDLC capability to use the ARPANET host/IMP protocol. M.G.

N83-34618# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
SOFTWARE ENGINEERING PRACTICES: THEIR IMPACT ON THE DESIGN OF A PROGRAM MAINTENANCE MANUAL M.S. Thesis
James H. Teuscher Dec. 1982 84 p refs
(AD-A126619) Avail: NTIS HC A05/MF A01 CSCL 09/2

The cost of software is fast becoming a major slice of DOD's automated data processing budge. Most of this cost is directly related to the maintenance of existing software. A primary cause is poor or non-existent documentation which leads to high costs when its comes time to change the software to correct errors, add enhancements, or to comply with changes in Federal regulations DOD policies. This thesis looks at the various software engineering techniques available to programmers and managers for the development of software documentation. A set of guidelines for an 'ideal' program maintenance manual is proposed. These guidelines are based on current DOD standards, examples of software maintenance manuals from industry, and applications of current software engineering practices. Author

N83-34619# Florida State Univ., Tallahassee. Dept. of Mathematics and Computer Science.
COMPILING AN ADVANCED HIGH-ORDER LANGUAGE FOR A MICROPROCESSOR. VOLUME 1: TECHNICAL DISCUSSION Final Report, Jan. - Nov. 1981
T. P. Baker Eglin AFB, Fla. Air Force Armament Lab. Jul. 1982 27 p refs
(Contract F08635-81-K-0062)
(AD-A126658; AFATL-TR-82-47-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

The possibility of establishing an Ada cross-compiler hosted on the CDC Cyber 6000 family and targeted to the Zilog Z8000 was studied. Initial work supports the feasibility of a complete implementation. The present front-end processor of the compiler is capable of parsing full Ada syntax processing most declarations and executable statements. The black-end processor of the compiler is less complete than the front-end although it has sucessfully translated simple Ada programs. During initial development, the author discovered a new implementation technique that may be beneficial to other Ada implementors. Full implementation of this ADA compiler is projected for October 1983 and will be the subject of subsequent reports. Author

N83-34620# Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.
A NUMBERLESS, TENSED LANGUAGE FOR ACTION ORIENTED TASKS Interim Report
David Alan Bourne 13 Oct. 1982 24 p refs Sponsored in part by Westinghouse Corp.
(AD-A126400; CMU-RI-TR-82-12) Avail: NTIS HC A02/MF A01 CSCL 09/2

Action oriented languages are number intensive. Graphic's languages are centered around where to draw something rather than what to draw. The where involves a tedious numeric description of vertices. Robotic's languages are also dominated by a where description, but now the where specifics a robot motion. The result is an array of numbers that obscures the meaning of the program to its reader. This paper shows how a number of linguistic devices can be used to eradicate the plethora of numbers from action oriented descriptions. Functions or verbs can be tensed (e.g., past tense) to modify their meaning without duplicating the root function. The result is an English-like description of a control structure. Arguments or nouns can be modified in name, like the use of a GENSYM function in Lisp which generates a unique variable name from a character string, and in number (e.g., singular vs. plural). The result is an Engish-like description of bound and quantified variables. The remaining quantitative description of action tasks can be relegated to a database whose management system is specialized for number management. The resulting language is a formal variant of a natural language with a LISP-like syntax (i.e., lists with functions in the first position). The programs approach the readability of a natural language without the cost of ambiguity that is inherent in natural descriptions. Finally, the programs can be pretty easily printed in English so that they can be read by non-programmers. Author

N83-34621# Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.
DP COMMAND SET
Dario Giuse 30 Oct. 1982 27 p
(AD-A126401; CMU-RI-TR-82-11) Avail: NTIS HC A03/MF A01 CSCL 09/2

DP, a highly interactive graphics editor that runs on a scientific personal computer, is described. DP is part of a circuit design system that was built at Carnegie-Mellon University to reduce the turnaround time between the conception and the implementation of prototype electronic circuits. Author

N83-34622# Naval Postgraduate School, Monterey, Calif.
INTEGRATED APPLICATION SOFTWARE SYSTEM M.S. Thesis
John Christopher Waters Dec. 1982 167 p refs
(AD-A126434) Avail: NTIS HC A08/MF A01 CSCL 09/2

As increasng data processing power becomes available at decreasing cost, greater numbers of nontechnical personnel are gaining access to automated systems that enhance their productivity. However, the sharp distinction between each of the support packages, and the requirement for the user to become familiar with different models, concepts and vocabularies is a barrier to reaching higher effectiveness. The premise is that these common support systems have equivalent functions and a large intersection of operations that can be integrated. A possible Integrated Application Software System (IASS) that will combine the needed capabilities into a functional system and present the user with a single data model and vocabulary set is studied. The data model which is proposed for use by the IASS is the relational data model, since it is universally understandable, and has a robust theoretical foundation. Author

N83-34623# Carnegie-Mellon Univ., Pittsburgh, Pa. Inst. for Robotics.
STUDYING SCIENTIFIC DISCOVERY BY COMPUTER SIMULATION Interim Report, Oct. 1982 - Mar. 1983
Gary L. Bradshaw, Patrick W. Langley, and Herbert A. Simon 30 Mar. 1983 9 p refs Submitted for publication
(Contract N00014-82-K-0168; Grant MH-07722; NR Proj. 049-514) (AD-A126438; CMU-CIP-WP-444; TR-2) Avail: NTIS HC A02/MF A01 CSCL 09/2

Scientific discovery is a complex process, but despite its complexity, it can be analyzed using two basic ideas from the theory of human problem solving - the notion of search through a problem space, and the notion of heuristics for directing that search down profitable paths. Black's discovery of the specific heat law is examined in the light of these concepts, and how BACON, an empirical discovery program, employs heuristics for finding numeric relations, positing intrinsic properties, and expecting symmetrical forms to rediscover this law is considered. Finally, the role of theory in scientific discovery is examined and a different approach to inducing Black's law that relies on the distinction between extensive and intensive terms, and on the notion of conservation is described. M.G.

N83-34624# Boeing Aerospace Co., Seattle, Wash.
SYNTACTIC VISUAL IMAGE GENERATION SYSTEM FEASIBILITY STUDY Final Interim Report, Oct. - Dec. 1982
Dec. 1982 10 p
(Contract MDA903-82-C-0101; ARPA Order 4278)
(AD-A127054) Avail: NTIS HC A02/MF A01 CSCL 09/2

This report briefly summarizes the progress of the Syntactic Visual Image Generation program through December 10, 1982. A summary of the progress in each subtask will be given, including a discussion of the hardware development status followed by a discussion of the software development status of the program. Author (GRA)

N83-34625# Air Force Academy, Colo.
PHD: A DATA HANDLING PROGRAM IN DEC BASIC
Armand A. Fannin, Jr. Feb. 1983 71 p
(AF Proj. 2303)
(AD-A126674; FJSRL-TR-83-0002) Avail: NTIS HC A04/MF A01 CSCL 09/2

A program (PHD) for storage, display, testing and manipulation of small numeric data collections (2 to 500 observations). The implementation is on a VAX 11/780 in BASIC. Modules allow entry, correction, storage, retrieval, sorting, least squares fitting and plotting. One may also add user written modules to manipulate sets of data. The graphics module given requires a Tektronix 4014 or compatible terminal. The program listing is included. M.G.

N83-34626# Ballistic Research Labs., Aberdeen Proving Ground, Md.
MAXIMUM LIKELIHOOD PROGRAM FOR SEQUENTIAL TESTING DOCUMENTATION
Ann E. McKaig and Jerry Thomas Mar. 1983 61 p refs
(AD-A126651; ARBRL-TR-02481) Avail: NTIS HC A04/MF A01 CSCL 09/2

The Army has used sensitivity testing for many years, especially in the areas of primer testing and armor penetrating projectiles. In sensitivity testing, only one observation per sample is obtained. This observation is characterized by a quantal response, i.e., go or no-go, explosion or nonexplosion, penetration or nonpenetration. The purpose of most sensitivity experiments is to determine the amount of stimuli needed in order to achieve a 50% probability of success. For armor penetrating projectiles, the stimulus is velocity. So in sensitivity testing, the aim is to determine the V sub 50, i.e., the velocity needed to have a 50% probability of penetrating the armor. There are many methods or schemes for collecting data in sensitivity tests. Some of the more popular ones are the Bruceton up-and-down method, the Langlie design, the Robbins-Monro design and the Alexander design. B.W.

N83-34627# Army Armament Research and Development Command, Aberdeen Proving Ground, Md.
A MULTIPLE LINE PLOTTING ROUTINE
Melinda B. Krummerich Mar. 1983 42 p ref
(DA Proj. 1L1-61102-AH-43)
(AD-126650; AD-F300214; ARBRL-MR-03250) Avail: NTIS HC A03/MF A01 CSCL 09/2

In analyzing ballistic data, it is often useful to compare similar

sets of data by plotting them on one graph. The Multiple Line Plotting Routine is designed to provide a means for producing such graphs. A method is available on Hewlett-Packard's 9845C Desktop Compute to create and recall plotted lines. The computer uses the MAT PLOT command which translates these lines into numbers stored in a three-dimensional array. The array may be called back to be redrawn on the screen or any peripheral plotter. This produces a presentable splot in a short amount of time. The routines described in this report are designed to run on a Hewlett-Packard 9845C Desktop Computer with the following options: Mass Storage ROM, I/O ROM, Graphics ROM, Structured Programming ROM and Advanced Programming ROM (AP ROM). These last two are not entirely necessary; without them, the user will need to rewrite any IF-THEN-ELSE statements and construct a subroutine to find the maximum and minimum values in a given array. Author

N83-34628# Harry Diamond Labs., Adelphi, Md.
BLOCK: INTERACTIVE BLOCK CHART DESIGN
Steven J. Choy Dec. 1982 25 p refs
(AD-A126637; HDL-TM-82-17) Avail: NTIS HC A02/MF A01 CSCL 09/2

A program was developed to interactively create and modify block diagrams and pictures on a computer graphics terminal. The program, called BLOCK, runs on the VAX 11/780 Master Systems Controller (MSC). The program provides for the interactive entry of lines, boxes, circles, arcs, diamonds, arrows, and text using artistically styled character fonts. All entities can be inserted using different colors and varying line textures. Hard copy of the created pictures can be produced on a plotter and on a color copying system, producing both transparencies and prints. The program is accessible to all computer terminals connected to the MSC. M.G.

N83-34629# Defense Communications Engineering Center, Reston, Va.
ACCESS LINE ENGINEERING COMPUTER PACKAGE
F. Kopf Oct. 1982 19 p refs
(AD-A126368; DCEC-TN-13-82) Avail: NTIS HC A02/MF A01 CSCL 09/2

The methodology used in the development of the Access Line Engineering Computer Package is described. Both the software used in the data preparation and in the analysis are discussed. Author

N83-34630# Colorado Univ., Boulder. Dept. of Computer Science.
COMPUTER TECHNIQUES FOR CLUSTER ANALYSIS
R. Michael Perry Apr. 1983 28 p
(Contract N00014-78-C-0433)
(AD-A128215; CU-CS-244-83) Avail: NTIS HC A03/MF A01 CSCL 09/2

Some computer techniques for cluster analysis of a set of points when distances between the points are known are discussed. In general points that are close together will be grouped in the same cluster. Moreover, clusters of points can be treated as single points and grouped into higher-order clusters, thereby obtaining a hierarchical arrangement that depicts large-scale features and fine detail as well. These techniques were used in psychological studies of conceptualization and memory retention at the University of Colorado, and the applications are briefly reviewed. R.J.F.

N83-34631# Naval Postgraduate School, Monterey, Calif.
CORRECTIONS AND IMPROVEMENTS TO THE INTERACTIVE COMPUTER PROGRAM FOR THE SURVIVABILITY EVALUATION OF AIRCRAFT CONCEPTUAL DESIGNS (VISAP) M.S. Thesis
Ronald Maxwell Hill Mar. 1983 183 p refs
(AD-A128203) Avail: NTIS HC A09/MF A01 CSCL 09/2

A computer program for assessing the survivability of fixed wing aircraft in the conceptual design phase was developed at the Naval Postgraduate School by Ball and Hesser in 1982. The program was called VISAP (Vought Interactive Survivability Assessment Program). This thesis presents corrections and improvements made to VISAP by the author. These corrections and improvements include improved efficiency and friendliness of the program from the user's viewpoint, enhanced output, and the incorporation of graphics to aid in the assessment and evaluation of aircraft conceptual design. Author (GRA)

N83-34632# Akron Univ., Ohio. Dept. of Civil Engineering.
EVALUATION OF A NONLINEAR FINITE ELEMENT PROGRAM, ABAQUS
T. Y. Chang and S. M. Wang 15 Mar. 1983 185 p refs
(Contract N00014-78-C-0691)
(AD-A128788; AUE-821) Avail: NTIS HC A09/MF A01 CSCL 09/2

An evaluation of the version 3 - ABAQUS, a general purpose finite element program, was conducted. The evaluation work consists of the review of its documentation, functional capability, and programming structure. Work also includes a section on advanced evaluation to investigate the numerical performance of the program. Author (GRA)

N83-34633# Sandia Labs., Albuquerque, N. Mex. Theoretical Div.
SELF-OPTIMIZED SECTOR (SOS) CODE SUMMARY
Bruce Goplen (Mission Research Corp., Alexandria, Va.), Robert E. Clark (Mission Research Corp., Alexandria, Va.), Robert C. Backstrom, and Charles N. Vittitoe Apr. 1983 55 p refs Sponsored by DOE
(DE83-012378; SAND-83-0254) Avail: NTIS HC A04/MF A01

The three-dimensional cartesian self-optimized sector (SOS) computer code was developed to simulate system-generated electromagnetic pulse phenomena. The SOS computer code is outlined to give a brief indication of its present and near-term capabilities and of the computer resources necessary for its use. Input and output are presented for a sample problem M.G.

N83-34634# Sandia Labs., Albuquerque, N. Mex. Fluid Mechanics and Heat Transfer Div.
PATRICIA: USER REFERENCE
Christine M. Korbin Mar. 1983 105 p refs
(Contract DE-AC04-76DP-00789)
(DE83-013142; SAND-83-013142) Avail: NTIS HC A06/MF A01

PATRICIA is an acronym for Practical Algorithm to Retrieve Information Coded In Alphanumeric. This document is a guide to the fourth major revision of PATRICIA, PAT IV, which has been implemented with considerations for portability in PASCAL on a VAX 11/780. This report is intended to be a user's manual for the PATRICIA code itself, and not an account of any particular application of the code. Author

N83-34635# Sandia Labs., Albuquerque, N. Mex. Solid Dynamics Dept.
QUALITY-ASSURANCE (QA) PROCEDURES FOR COMPUTER SOFTWARE IN DEPARTMENT 1530
J. W. Swegle, M. E. Kipp, M. P. Sears, C. B. Selleck, and T. G. Trucano May 1983 29 p Sponsored by DOE
(DE83-013434; SAND-83-0843) Avail: NTIS HC A03/MF A01

A plan was developed for Quality Assurance of computer software maintained in Department 1530. The plan is described and all the definitions, standards, requirements, and participant responsibilities necessary for implementing the plan are provided. Author

N83-34636# Brookhaven National Lab., Upton, N. Y. Medical Dept.
THE 2-D FITTING AND INTERPOLATION APPLIED TO IMAGE-DISTORTION ANALYSIS
Y. Bizais, I. G. Zubal, R. W. Rowe, G. W. Bennett, and A. B. Brill 1982 13 p refs Presented at the NATO ASI on Pictorial Analysis Conf., Bonas, France, 1-12 Aug. 1982
(Contract DE-AC02-76CH-00016)
(DE83-006684; BNL-32371; CONF-8208112-1) Avail: NTIS HC A02/MF A01

A practical method for distortion analysis was developed by imaging an array of points objects, the pattern of which is known, but with unknown actual locations. A 2D fitting to the discrete pattern estimates the true locations of the point objects, from the measured locations, assuming random perturbations. This procedure leads to the knowledge of distortion characteristics at some sparse and arbitrary points of the image field. Therefore, an optimal expansion of the sparsely sampled function to cover the whole image was studied in order to estimate distortion characteristics in each pixel. Examples drawn from Nuclear Medicine image are presented. DOE

N83-34637# Mound Lab., Miamisburg, Ohio.
CAD/CAM ACTIVITIES: ADVANCED MANUFACTURING DEVELOPMENT SECTION Progress Status Report for FY 1982
Donald E. Wendeln, Ronald A. Johnson, Jack M. Osborne, Christopher A. Miller, and Carrie D. Clark 1 Oct. 1982 25 p
(Contract DE-AC04-76DP-00053)
(DE83-001865; MLM-MU-82-70-0010) Avail: NTIS HC A02/MF A01

Activities at the Mound Facility related to the automatic fabrication and inspection of PETN, HE Ring, and Inert pellets using robots, and the use of computers for gauging, microscoping and environmental monitoring activities in high explosive fabrication facilities, the computer-aided design of explosive assemblies, and the development of automated computer-controlled optical inspection systems are summarized. DOE

N83-34638# Sandia Labs., Albuquerque, N. Mex.
IIR ALGORITHMS FOR ADAPTIVE LINE ENHANCEMENT
R. A. David, S. D. Stearns, G. R. Elliott, and D. M. Etter (New Mexico Univ., Albuquerque) 1983 4 p refs Presented at the Intern. Conf. on Acoustics, Speech and Signal Processing, Boston, 14 Apr. 1983
(Contract DE-AC04-76DP-00789)
(DE83-005009; SAND-82-2937C; CONF-830407-1) Avail: NTIS HC A02/MF A01

A simple IIR structure for the adaptive line enhancer is introduced. Two algorithms based on gradient-search techniques are presented for adapting the structure. Results from experiments which utilized real data as well as computer simulations are provided. DOE

N83-34639# Argonne National Lab., Ill.
SOLVING OPEN QUESTIONS WITH AN AUTOMATED THEOREM-PROVING PROGRAM
L. Wos 1982 39 p refs Presented at the 6th CADE Conf. on Automated Deduction, New York, 1 Jun. 1982
(Contract W-31-109-eng-38)
(DE83-008686; CONF-8206178-1) Avail: NTIS HC A03/MF A01

The primary objective is to demonstrate the feasibility of using an automated theorem-proving program as an automated reasoning assistant. Such usage is not merely a matter of conjecture. As evidence, a number of open questions which were solved with the aid of a theorem-proving program are cited. The open questions are taken from studies of ternary boolean algebra, finite semigroups, equivalential calculus, and the design of digital circuits. Despite the variety of successes, no doubt there still exists many who are very skeptical of the value of automating any form of deep reasoning. The secondary objective is that of dispelling, at least in part, some of the resistance to such automation. To do this, two myths are discussed which form the basis for the inaccurate evaluation of both the usefulness and the potential of automated theorem proving. Rejection of the two myths removes an important obstacle to assigning to an automated theorem-proving program its proper role - the role of colleague and assistant. DOE

N83-34640# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
DATA ANALYSIS THROUGH A GENERALIZED INTERACTIVE COMPUTER ANIMATION METHOD (DATICAM)
J. Nick Curtis and David H. Schwieder 1983 9 p Presented at the Computer Animation Method Conf., CAMP '83, Berlin, 14-17 Mar. 1983
(Contract DE-AC07-76ID-01570)
(DE83-010398; EGG-M-30182; CONF-830346-1) Avail: NTIS HC A02/MF A01

An interactive computer animation method (DATICAM) designed to aid in the analysis of nuclear research data is described. Analysts use DATICAM to produce computer codes that are better able to predict the behavior of nuclear power reactors. In addition to increased code accuracy, DATICAM has saved manpower and computer costs. It was generalized to assist in the data analysis of virtually any data-producing dynamic process. DOE

N83-34641# Science Applications, Inc., San Leandro, Calif.
STEALTH: A LANGUAGE-EXPLICIT FINITE-DIFFERENCE CODE FOR SOLIDS, STRUCTURAL AND THERMOHYDRAULIC ANALYSIS: VOLUME 2: SAMPLE AND VERIFICATION PROBLEMS
R. Hofmann Aug. 1982 492 p Sponsored by EPRI
(EPRI Proj. 307-1)
(DE83-900190; EPRI-NP-2080-Vol-2) Avail: NTIS HC A21/MF A01

The STEALTH sample and verification problems are presented to help users become familiar with STEALTH capabilities, input, and output. Problems are grouped into articles which are completely self-contained. Sample and verification calculations are divided into the following general categories: transient mechanical calculations dealing with solids; transient mechanical calculations dealing with fluids; transient thermal calculations dealing with solids; transient thermal calculations dealing with fluids; static and quasi-static calculations; and complex boundary interaction calculations. DOE

N83-34642# Oak Ridge National Lab., Tenn. Engineering Physics Div.
GRESS: GRADIENT-ENHANCED SOFTWARE SYSTEM. VERSION B, USER'S GUIDE
E. M. Oblow Apr. 1983 52 p
(Contract W-7405-eng-26)
(DE83-010463; ORNL/TM-8339) Avail: NTIS HC A04/MF A01

A FORTRAN compiler language (GRESS) that enhances conventional FORTRAN programs with analytic differentiation of arithmetic statements is described. It handles any standard FORTRAN code which contains arithmetic text material as part of the source program. The GRESS compiler reads the FORTRAN source code text, redefines the variables and their storage locations, searches for arithmetic statements, translates the latter for gradient calculations, and then generates a new source program with now includes gradient capabilities in all arithmetic statements. Therefore, GRESS allows any standard FORTRAN code to be upgraded to calculate any derivatives required, whether they be for internal use in a calculation (e.g., for interaction) or for external use (e.g., sensitivity studies). The independent variables with respect to which the partial derivaties are calculated in the FORTRAN source code may be freely selected, and the only theoretical restriction is that the sequence of computation must be continuous and differentiable. The gradients are calculated according to the chain rule of differential standard chain rule. Thus, no numerical difference scheme is involved and the results are as accurate as any algebraic computations on the host computer. DOE

N83-34643# Argonne National Lab., Ill. Mathematics and Computer Science Div.
PROGRAMMING ENVIRONMENT APPROACH TO MATHEMATICAL SOFTWARE DEVELOPMENT
Wayne R. Cowell 1983 14 p refs Presented at the Intern. Conf. on Tools, Methods and Languages for Sci. and Eng. Computations, Paris, 17 May 1983
(Contract W-31-109-eng-38)
(DE83-009494; CONF-830531) Avail: NTIS HC A02/MF A01

Mathematical software is created in collaborative projects. Essential to successful collaboration is the construction and

maintenance of shared project data files containing software under development, test cases and results, software documentation, and documentation of project policy and procedures. Research in software tools and portable operating systems has led to the construction of virtual programming environments that operate on the contents of virtual file systems. When the tools are FORTRAN-oriented, and new tools may be added to the environment by users, the stage is set for a collaborative mathematical software project organized around the use of such a system. The lines of research over the last decade that have brought us to the threshold of environment-oriented projects and set forth general requirements for the programming environment and its associated file structure are traced. An approach to various project activities when the data are contained in the virtual file structure is sketched. A paradigm for the mathematical software programming environment and file structure is the Toolpack system. The intention is to simulate discussion, refinement, and trial of an environment-oriented approach to mathematical software development. DOE

N83-34644# Bendix Corp., Kansas City, Mo.
CAD-CAM EXPERIENCES AT BENDIX KANSAS CITY: THE USER PERSPECTIVE
C. Mentesana Apr. 1983 8 p ref Presented at the Appl. and Graphics Products Conf., Savannah, 11-14 Apr. 1983
(Contract DE-AC04-76DP-00613)
(DE83-011121; BDX-613-2888R; CONF-830473-2) Avail: NTIS HC A02/MF A01

The Bendix Kansas City Division manufactures a variety of precision mechanical, electrical and electronic components and assemblies for the Department of Energy. CAD-CAM has been in use at Bendix for about two years. Development of CAD-CAM is the responsibility of the CAD-CAM Operations group. This group works with users, in-house computer professionals and vendors to provide CAD-CAM products and services. DOE

N83-34645# Bendix Corp., Kansas City, Mo.
CAD-CAM AT BENDIX KANSAS CITY: THE BICAM SYSTEM
D. R. Witte Apr. 1983 21 p Presented at the Appl. and Graphics Products Conf., Savannah, 11-14 Apr. 1983
(Contract DE-AC04-76DP-00613)
(DE83-011122; BDX-613-2887R; CONF-830473-1) Avail: NTIS HC A02/MF A01

Bendix Kansas City Division (BBKC) has been involved in Computer Aided Manufacturing (CAM) technology since the late 1950's when the numerical control (N/C) analysts installed computers to aid in N/C tape preparation for numerically controlled machines. Computer Aided Design (CAD) technology was introduced in 1976, when a number of 2D turnkey drafting stations were procured for printed wiring board (PWB) drawing definition and maintenance. In June, 1980, CAD-CAM Operations was formed to incorporate an integrated CAD-CAM capability into Bendix operations. In March 1982, a ninth division was added to the existing eight divisions at Bendix. Computer Integrated Manufacturing (CIM) is a small organization, reporting directly to the general manager, who has responsibility to coordinate the overall integration of computer aided systems at Bendix. As a long range plan, CIM had adopted a National Bureau of Standards (NBS) architecture titled Factory of the Future. Conceptually, the Bendix CAD-CAM system has a centrally located data base which can be accessed by both CAD and CAM tools, processes, and personnel thus forming an integrated Computer Aided Engineering (CAE) System. This is a key requirement of the Bendix CAD-CAM system that will be presented in more detail. DOE

N83-34646# Electricite de France, Chatou. Dept. Optimisation et Automatisation des Processus.
DESCRIPTION OF A NUMERICAL MODEL OF A LIGHT WATER NUCLEAR REACTOR PRESSURIZER [DESCRIPTION D'UN MODELE NUMERIQUE DE PRESSURISEUR DE TRANCHE NUCLEAIRE A EAU LEGERE]
P. Siarry Nov. 1981 255 p refs In FRENCH
(HP-40/81/344) Avail: NTIS HC A12/MF A01

A monitor-command model to reduce thermal stresses in the piping of pressurizers, particularly at angles, is presented. The thermodynamic equations of water are elaborated, and the modeling of the pressure and level regulation circuits is described. Coupling of the model to a model of the rest of the reactor, based on the LILLIPUT program, is outlined. Author (ESA)

N83-34647# Electricite de France, Clamart. Div. Machines Tournantes.
MONITORING AND REAL-TIME OPERATION SOFTWARE FOR MODCOMP CLASSIC [LOGICIEL DE SURVEILLANCE ET DE TRAITEMENT EN TEMPS REEL SUR MODCOMP CLASSIC]
J. L. Duchateau 19 Mar. 1982 11 p refs In FRENCH
(HM-16-977) Avail: NTIS HC A02/MF A01

Software for processing model rotor data on the Modcomp minicomputer is described. A tracing table can be followed on VDU's, and the evolution of 128 sizes can be followed by oscilloscope. It handles 32 alarms, sending error messages.
Author (ESA)

62 COMPUTER SYSTEMS

Includes computer networks.

N83-34648# School of Aerospace Medicine, Brooks AFB, Tex. Aerospace Medical Div.
IMPLEMENTATION OF A COMPUTER LOCAL AREA NETWORK Final Report, 1 Aug. 1978 - 31 May 1982
Robert A. Balusek, Bruce R. Montague, and Douglas H. Threatt Feb. 1983 28 p
(AD-A126738; USAFSAM-TR-83-4) Avail: NTIS HC A03/MF A01 CSCL 05/1

This paper summarizes over three years of exprience in implementing a computer local area network. A detailed description of the evolution of this network is followed by a list of lessons learned and conclusions drawn concerning future directions. The implemented network was conservative and classical in many respects. This is a technical paper written using a reflective and detailed style in the belief that some of the lessons of this experience may be of value to other implementors responsible for the nuts and bolts level of getting the job done. Author

N83-34649# Naval Postgraduate School, Monterey, Calif.
REQUIREMENTS ANALYSIS AND SPECIFICATION METHODOLOGIES FOR EMBEDDED COMPUTER SYSTEMS: SURVEY AND CASE STUDY M.S. Thesis
Nicholas David Hunten Hammond Dec. 1982 107 p refs
(AD-A126700) Avail: NTIS HC A06/MF A01 CSCL 09/2

While considerable advances have been made in the technology of software development, costs continue to rise. Research has shown that incomplete, ambiguous or inconsistent requirements specifications are a frequent cause of cost escalation and poor quality of the end product. This thesis reviews the problems in this area and their causes and examines a number of current systems and methodologies designed to better state the users' requirements. Techniques developed by the US Naval Research Laboratory for generating requirements specifications for embedded computer systems are selected for detailed examination and the results of a limited case study in the application of these techniques to a Navy weapon system are presented. These indicate that use of the techniques need not require a high degree of expertise in computer science and that they are adaptable to new systems.
Author

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N83-34650# University of Southern California, Marina del Rey. Information Sciences Inst.

AN OVERVIEW OF THE PENMAN TEXT GENERATION SYSTEM

William C. Mann Apr. 1983 15 p refs
(Contract F49620-79-C-0181)
(AD-A128194; ISI/RR-83-114) Avail: NTIS HC A02/MF A01 CSCL 05/7

The problem of programming computers to produce natural language explanations and other texts on demand is an active research area in artifical intelligence. In the past, research systems designed for this purpose have been limited by the weakness of their linguistic bases, especially their grammars, and their techniques often cannot be transferred to new knowledge domains. A new text generation system, Penman, is designed to overcome these problems and produce fluent multiparagraph text in English in response to a goal presented to the system. Penman consists of four major modules: a knowledge acquisition module which can perform domain-specific searches for knowledge relevant to a given communication goal; a text planning module which can organize the relevant information, decide what portion to present, and decide how to lead the reader's attention and knowledge through the content; a sentence generation module based on a large systemic grammar of English; and an evaluation and plan-perturbation module which revises text plans based on evaluation of text produced. Development of Penman has included implementation of the largest systemic grammar of English in a single notation. A new semantic notation has been added to the systemic framework, and the semantics of nearly the entire grammar has been defined. The semantics is designed to be independent of the system's knowledge notation, so that it is usable with widely differing knowledge representations, including both frame-based and predicate-calculus-based approaches. Author (GRA)

N83-34651# Pittsburgh Univ., Pa. Inst. for Computational Mathematics and Applications.

FEEDBACK SYSTEMS AND ADAPTIVITY FOR NUMERICAL COMPUTATIONS

Werner C. Rheinboldt 1983 19 p refs Presented at the ARO Workshop on Adaptive Numerical Methods for Partial Differential Equations, College Park, Md., 14-16 Feb. 1983
(Contract N00014-80-C-0455)
(AD-A128066; ICMA-83-53) Avail: NTIS HC A02/MF A01 CSCL 12/1

A theory of adaptivity for numerical procedures is developed. The basic concept is that of a feedback system for a family of incompletely known problems. Then performance measures are introduced under which a system is defined to be adaptive if its performance is best in a specified sense for a particular class of problems and starting states. An adaptive quadrature example illustrates the concepts and applications to further classes of problems are discussed. Author (GRA)

N83-34652# MATRA Espace, Paris-Velizy (France).

STANDARD GENERIC APPROACH FOR SPACECRAFT INTELLIGENCE AND AUTOMATION. PHASE 1, VOLUME 2: TECHNICAL REPORT Final Report

G. Berger, J. Cornet, M. Cellier, L. Riou, J. Sotta, and M. Thibaut Paris ESA 1983 276 p 2 Vol.
(Contract ESTEC-4869/81/NL-PP)
(DM55/JPS/JP/317-83-Vol-2; ESA-CR(P)-1759-Vol-2) Avail: NTIS HC A12/MF A01

Applications of onboard autonomy and data processing, and the corresponding spacecraft and ground control organization were identified by analyzing the Viking 75 deep space mission and the ERS-1 (ESA satellite) Earth observation mission. Telecommunication satellites, STS, data relay satellites and large space stations were also studied. An approach to spacecraft intelligence and autonomy based on a hierarchical decentralized system structure, in order to limit failure propagation, simplify interfaces, and improve performance predictability, is proposed. Onboard management is subdivided into routine, crisis, and end product management. Orbit determination and control is autonomous. Author (ESA)

N83-34653# Oxford Univ. (England). Dept. of Engineering Science.

ANALYSIS AND DESIGN OF LINEAR MULTI-VARIABLE FEEDBACK SYSTEMS IN THE PRESENCE OF ADDITIVE PERTURBATIONS

R. W. Daniel and B. Kouvaritakis Jun. 1983 52 p refs
(OUEL-1476/83) Avail: NTIS HC A04/MF A01

The concept of normal approximations is introduced into the analysis of uncertain linear multivariable feedback systems, in order to derive a criterion for the stability of plants subject to additive perturbations. This criterion enables a complete assessment of stability margins in that it provides a measure of tolerance to uncertainty as well as a measure of gain/phase margins. The approach leads to a systematic design procedure which minimizes the uncertainty effects by attaining the condition of normality. It improves the stability margins by robust gain/phase sharing. Results are insensitive to small perturbations on the nominal plant model and enable information concerning the structure of uncertainty to be considered. Author (ESA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N83-34654 Technische Universitaet, Munich (West Germany). Inst. fuer Mathematik und Informatik.

NEW METHODS FOR COMPUTING NUMERICAL VALUES OF BRANCHING SOLUTIONS TO THE BOUNDARY VALUE PROBLEM FOR ORDINARY DIFFERENTIAL EQUATIONS [NEUE METHODEN ZUR NUMERISCHEN BERECHNUNG ABZWEIGENDER LOESUNGEN BEI RANDWERTPROBLEMEN GEWOEHNLICHER DIFFERENTIALGLEICHUNGEN]

Ruediger Seydel Jul. 1982 126 p refs In GERMAN
(TUM-M8215; TUM-MATH-07-82-M15-250/1-FMA) Copyright. Avail: Issuing Activity

Methods for solving the problem of computing branching solutions as a special case of elementary equations, which can then be solved by standard procedures are given. Three methods that allow numerical computation of branching solutions to the boundary value problem for ordinary differential equations are proposed. The procedures handle bifurcations as well as reversal points and are mechanizable. The methods are tried out for a large number of bifurcations, and are numerically solved. An algorithm is given for the computation of branchings for a trivial solution. Author (ESA)

N83-34655# Aeronautical Research Labs., Melbourne (Australia).

EXPERIENCE WITH TWO ESTIMATORS FOR THE THREE-PARAMETER WEIBULL DISTRIBUTION

A. D. Graham Nov. 1982 28 p refs
(ARL/Struc-Note-484; AP-002-927) Avail: NTIS HC A03/MF A01

Two methods for estimating the three parameters of the Weibull extreme value distribution are described and tested using Weibull distributed data. Graphical techniques used to support the estimation indicate that any bias may arise from estimations on the boundary of the parameter space. M.G.

N83-34656*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Mechanical Engineering.

THEORETICAL INVESTIGATION OF THE FORCE AND DYNAMICALLY COUPLED TORSIONAL-AXIAL-LATERAL DYNAMIC RESPONSE OF LINEARED ROTORS Annual Status Report

J. W. David and L. D. Mitchell 1982 33 p
(Grant NsG-3239)
(NASA-CR-173013; NAS 1.26:173013) Avail: NTIS HC A03/MF A01 CSCL 12A

Difficulties in solution methodology to be used to deal with

the potentially higher nonlinear rotor equations when dynamic coupling is included. A solution methodology is selected to solve the nonlinear differential equations. The selected method was verified to give good results even at large nonlinearity levels. The transfer matrix methodology is extended to the solution of nonlinear problems. Author

N83-34657*# Lincoln Lab., Mass. Inst. of Tech., Lexington.
OPTIMAL SEARCHES FOR ASTEROIDS
L. G. Taff [1981] 23 p refs Submitted for publication
(Grant NAGw-232; Contract F19628-80-C-0002)
(NASA-CR-173029; NAS 1.26:173029) Avail: NTIS HC A02/MF A01 CSCL 12A

Optimal searches for a fixed object are discussed, and the rigorous analytical results of discrete search theory are presented. The totally optimal, the uniformly optimal, the locally optimal, and the fastest searches are shown to be identical under not too restrictive assumptions. The mathematical formalism is illustrated by an Earth-approaching asteroid search and optimal searches for such objects are explicitly constructed. The approximation that Earth-approaching asteroids are fixed is equivalent to having a very high (> equiv 100 sq degs/hour) search rate. Generalizations to other types of astronomical search are briefly mentioned. Author

N83-34658*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Inst. for Computer Applications in Science and Engineering.
A ROTATIONALLY BIASED UPWIND DIFFERENCE SCHEME FOR THE EULER EQUATIONS Final Report
Stephen F. Davis Jul. 1983 52 p refs
(Contract NAS1-17070)
(NASA-CR-172179; NAS 1.26:172179; Rept-83-37) Avail: NTIS HC A04/MF A01 CSCL 12A

The upwind difference schemes of Godunov, Osher, Roe and van Leer are able to resolve one dimensional steady shocks for the Euler equations within one or two mesh intervals. Unfortunately, this resolution is lost in two dimensions when the shock crosses the computing grid at an oblique angle. To correct this problem, a numerical scheme was developed which automatically locates the angle at which a shock might be expected to cross the computing grid and then constructs separate finite difference formulas for the flux components normal and tangential to this direction. Numerical results which illustrate the ability of this method to resolve steady oblique shocks are presented. M.G.

N83-34659*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ON THE RESOLVENT CONDITION IN THE KREISS MATRIX THEOREM Final Report
Randall J. LeVeque and Lloyd N. Trefethen Jul. 1983 15 p refs Sponsored in part by National Science Foundation
(Contract NAS1-17070)
(NASA-CR-172177; NAS 1.26:172177; Rept-83-35) Avail: NTIS HC A02/MF A01 CSCL 12A

The Kreiss Matrix Theorem asserts the uniform equivalence over all N x N matrices of power boundedness and a certain resolvent estimate. It is shown that the ratio of the constants in these two conditions grows linearly with N, and the optimal proportionality factor is obtained up to a factor of 2. Analogous results are also given for the related problem involving matrix exponentials. The proofs make use of a lemma that may be of independent interest, which bounds the arch length of the image of a circle in the complex plane under a rational function. M.G.

N83-34660*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LOW FREQUENCY ACOUSTIC AND ELECTROMAGNETIC SCATTERING Final Report
S. I. Hariharan and R. C. MacCamy Aug. 1983 28 p refs
(Contract NAS1-17070; Grant NSF MCS-80-01944)
(NASA-CR-172203; NAS 1.26:172203; Rept-83-43) Avail: NTIS HC A03/MF A01 CSCL 12A

This paper deals with two classes of problems arising from acoustics and electromagnetics scattering in the low frequency stations. The first class of problem is solving Helmholtz equation with Dirichlet boundary conditions on an arbitrary two dimensional body while the second one is an interior-exterior interface problem with Helmholtz equation in the exterior. Low frequency analysis show that there are two intermediate problems which solve the above problems accurate to 0(k(2) log k) where k is the frequency. These solutions greatly differ from the zero frequency approximations. For the Dirichlet problem numerical examples are shown to verify the theoretical estimates. B.W.

N83-34661*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
VECTOR-ALGEBRA APPROACH TO EXTRACT DENAVIT-HARTENBERG PARAMETERS OF ASSEMBLED ROBOT ARMS
L. Keith Barker Aug. 1983 34 p refs
(NASA-TP-2191; L-15621; NAS 1.60:2191) Avail: NTIS HC A03/MF A01 CSCL 12A

The Denavit-Hartenberg parameters characterize the joint axis systems in a robot arm and, naturally, appear in the transformation matrices from one joint axis system to another. These parameters are needed in the control of robot arms and in the passage of sensor information along the arm. This paper presents a vector algebra method to determine these parameters for any assembled robot arm. The idea is to measure the location of the robot hand (or extension) for different joint angles and then use these measurements to calculate the parameters. Author

N83-34662*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRECONDITIONERS FOR THE SPECTRAL MULTIGRID METHOD Final Report
Timothy N. Phillips, Thomas A. Zang, and M. Youssuff Hussaini Sep. 1983 34 p refs
(Contracts NAS1-17070; NAS1-17130)
(NASA-CR-172202; ICASE-83-48; NAS 1.26:172202) Avail: NTIS HC A03/MF A01 CSCL 12A

The systems of algebraic equations which arise from spectral discretizations of elliptic equations are full and direct solutions of them are rarely feasible. Iterative methods are an attractive alternative because Fourier transform techniques enable the discrete matrix-vector products to be computed with nearly the same efficiency as is possible for corresponding but sparse finite difference discretizations. For realistic Dirichlet problems preconditioning is essential for acceptable convergence rates. A brief description of Chebyshev spectral approximations and spectral multigrid methods for elliptic problems is given. A survey of preconditioners for Dirichlet problems based on second-order finite difference methods is made. New preconditioning techniques based on higher order finite differences and on the spectral matrix itself are presented. The preconditioners are analyzed in terms of their spectra and numerical examples are presented. Author

N83-34663# Oregon State Univ., Corvallis. Dept. of Electrical and Computer Engineering.
AN OPTIMAL APPROXIMATION FOR A CERTAIN CLASS OF NONLINEAR FILTERING PROBLEMS Ph.D. Thesis
Talal Umar Halawani Mar. 1983 143 p refs
(Contract N00014-81-K-0814; NR Proj. 608-003)
(AD-A126583; OSU-ONRTR83-1) Avail: NTIS HC A07/MF A01 CSCL 12/1

An approximation technique to a certain class of nonlinear filtering problem is considered. The method is based on an approximation of nonlinear, partially observable systems by a stochastic control problem with fully observable state. The filter development proceeds from the assumption that the unobservables are conditionally Gaussian with respect to the observations initially. The concepts of both conditionally Gaussian processes and an optimal-control approach to filtering are utilized in the filter development. A two-step, nonlinear, recursive estimation procedure (TNF), compatible with the logical structure of the optimal mean-square estimator, generates a finite-dimensional, nonlinear

filter with improved characteristics over most of the traditional methods. Moreover, a 'close' (in the mean-square sense) approximation for the original system is generated as well. In general the nonlinear filtering problem does not have a finite-dimensional recursive synthesis. Thus, the proposed technique may expand the range of practical problems that can be handled by nonlinear filtering. A detailed derivation for the filter with global property is presented. Extension of the results to large-scale nonlinear systems is accomplished by incorporating a novel decomposition scheme in the filter design. M.G.

N83-34664# Naval Postgraduate School, Monterey, Calif.
TABLES FOR A NEW MULTIVARIATE GOODNESS-OF-FIT TEST Interim Report
Richard Franke and Toke Jayachandran Feb. 1983 19 p refs
(AD-A126390) Avail: NTIS HC A02/MF A01 CSCL 12/1

Tables of critical values for a new multivariate goodness-of-fit test introduced by Foutz are presented. Some details of the improved asymptotic approximation and evaluation of its accuracy are given. Author

N83-34665# Wisconsin Univ., Madison. Mathematics Research Center.
SOME ASYMPTOTIC FORMULAS FOR MARKOV CHAINS WITH APPLICATIONS TO SIMULATION
Peter W. Glynn Mar. 1983 21 p refs Sponsored in part by the Natural Sciences and Engineering Research Council of Canada
(Contracts DAAG29-80-C-0041; N00014-76-C-0578; Grant NSF MCS-79-09139; NR Proj. 042-343)
(AD-A128074; MRC-TSR-2487) Avail: NTIS HC A02/MF A01 CSCL 12/1

Various techniques have been proposed for determination of confidence intervals associated with steady-state quantities in simulation. Evaluation of such procedures requires comparison of their performance on stochastic systems with known characteristics. In this paper, the authors therefore derive computable formulas for the initial bias, variance and spectrum of the sample mean in finite state Markov chains, and discuss their relevance to the steady-state simulation problem. GRA

N83-34666# Wisconsin Univ., Madison. Mathematics Research Center.
ON A NONLINEAR EIGENVALUE PROBLEM OCCURRING IN POPULATION GENETICS
Ph. Clement and L. A. Peletier Mar. 1983 34 p refs
(Contract DAAG29-80-C-0041)
(AD-A128073; MRC-TSR-2495) Avail: NTIS HC A03/MF A01 CSCL 12/1

A nonlinear eigenvalue problem which arises as a simple diffusion model for the propagation of genetic material in a population is discussed. A set of nondecreasing equilibrium solutions and their stability properties are studied. M.G.

N83-34667# Wisconsin Univ., Madison. Mathematics Research Center.
APPROXIMATION BY SMOOTH BIVARIATE SPLINES ON A THREE-DIMENSIONAL MESH
Rong-ging Jia Mar. 1983 27 p refs
(Contract DAAG29-80-C-0041)
(AD-A128072; MRC-TSR-2494) Avail: NTIS HC A03/MF A01 CSCL 12/1

Univariate splines have been proved quite useful in practice. However, if one wants to fit a surface, or solve a partial differential equation numerically, one would naturally think of using multivariate splines. Here splines still mean piecewise polynomial functions. In this respect, a basic question is to ascertain, for a given mesh delta and a family S of splines on delta, what its optimal approximation order is. This question is challenging even for a regular triangular mesh delta, as soon as one demands that the approximating functions have a certain amount of smoothness. The report records a step toward answering the above question.
Author (GRA)

N83-34668# Yale Univ., New Haven, Conn. Dept. of Computer Science.
CHEBYSHEV ACCELERATION TECHNIQUES FOR SOLVING NONSYMMETRIC EIGENVALUE PROBLEMS
Youcef Saad Dec. 1982 32 p refs
(Contract N00014-76-C-0277; Grant NSF MCS-81-04874)
(AD-A128062; TR-255) Avail: NTIS HC A03/MF A01 CSCL 12/1

The present paper deals with the problem of computing a few of the eigenvalues with largest (or smallest) real parts, of a large sparse nonsymmetric matrix. We present a general acceleration technique based on Chebyshev polynomials and discuss its practical application to Arnoldi's method and the subspace iteration method. The resulting algorithms are compared with the classical ones in a few experiments which exhibit a sharp superiority of the Arnoldi-Chebyshev approach. GRA

N83-34669# Cornell Univ., Ithaca, N.Y. Biometrics Unit.
PAIRWISE ORTHOGONAL F-RECTANGLE DESIGNS
W. T. Federer, A. S. Hedayat (Illinois Univ., Chicago), and J. P. Mendeli (Virginia Commonwealth Univ., Richmond) Dec. 1982 16 p refs
(Grant AF-AFOSR-0170-80; AF Proj. 2304)
(AD-A128099; AFOSR-83-0332TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The concept of pairwise orthogonal Latin square designs is applied to r row by c column experiment designs which are called pairwise orthogonal F-rectangle designs. These designs are useful in designing successive and/or simultaneous experiments on the same set of rc experimental units, in constructing codes, and in constructing orthogonal arrays. A pair of orthogonal F-rectangle designs exists for any set of v treatments (symbols), whereas no pair of orthogonal Latin square designs of orders two and six exists, and one of the two construction methods presented does not rely on any previous knowledge about the existence of a pair of orthogonal Latin square designs, whereas the second one does. It is shown how to extend the methods to r = pv row by c = gv column designs and how to obtain t pairwise orthogonal F-rectangle designs. When the maximum possible number of pairwise orthogonal F-rectangle designs is attained the set is said to be complete. Complete sets are obtained for all v for which v is a prime power. The contruction method makes use of the existence of a complete set of pairwise orthogonal Latin square designs and of an orthogonal array. Author

N83-34670# Wisconsin Univ., Madison. Mathematics Research Center.
BLOW-UP OF RADIAL SOLUTIONS OF LINEAR WAVE EQUATION U = PARTIAL DERIVATIVE F OF U SUB t WITH RESPECT TO THE PARTIAL DERIVATIVE OF T IN THREE SPACE DIMENSIONS Technical Summary Report
John Fritz Mar. 1983 31 p refs
(Contract DAAG29-80-C-0041)
(AD-A128093; MRC-TSR-2493) Avail: NTIS HC A03/MF A01 CSCL 12/1

The strict solutions u=u(x1, x2, x3, t)=u(x,t) of the differential wave equation u-u sub tt-delta u = partial derivative F(u sub t) with respect to the partial derivative of t, are considered. It is shown that every non-trivial solution u blows up after a finite timme T if epsilon is sufficiently small (epsilon representing the 'amplitude' of the initial data). M.G.

N83-34671# North Carolina Univ., Chapel Hill. Center for Stochastic Processes.
CENTRAL LIMIT THEORY FOR MARTINGALES VIA RANDOM CHANGE OF TIME
Holger Rootzen (Copenhagen Univ.) Feb. 1983 39 p refs
(Contract F49620-82-C-0009; AF Proj. 2304)
(AD-A128439; AFOSR-83-0421TR; TR-28) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper contains an exposition of the by now rather complete central limit theory for discrete parameter martingales providing new and efficient proofs. The basic idea is to start by proving a

central limit theorem under quite restrictive conditions (that the summands tend uniformly to zero and that the sums of squares converge uniformly) and then to obtain the most general results by random change of time and truncation. The emphasis is on the sums of squares (or squared variation process), and Burkholder's square function inequality plays a crucial role in the development. In particular, this approach leads to a very short and direct proof of tightness. In the proofs we make much use of a result which is believed to be new and which binds together convergence to zero of sums and of sums of conditional expectations. In the final section, the results are extended to several dimensions, to mixing convergence, and to convergence to mixtures of normal distributions. Author (GRA)

N83-34672# University of Central Florida, Orlando. Dept. of Mathematics and Statistics.

DOMINATES ON EQUIVALENCE CLASSES OF SEMIGROUP OPERATIONS Final Report, May 1981 - Aug. 1982

Howard Sherwood Oct. 1982 22 p refs Presented at the 19th Intern. Symp. on Functional Equations, Brittany, France, May 1981 and at the 20th Intern. Symp. on Functional Equations, Oberwolfach, West Germany, Aug. 1982

(Grant AF-AFOSR-0124-81; AF Proj. 2304)

(AD-A128463; AFOSR-83-0385TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Initially the problem was to study the dominates relation on a collection of semigroup operations called triangular norms. This led to an equivalent problem -- studying subadditivity of certain semigroup operations defined on the non-negative reals. The setting was later generalized to include both problems and to bring essentials of the problem into sharper focus. In the generalization, a partially ordered set S was endowed with the collection, Op(s), of all semigroup operations which had the same identity, e, and were non-decreasing in place. The dominates relation was defined on Op(S). The collection, Map(S), of order-preserving bijections from S to S map e to itself was used to partition Op(S) into equivalence classes -- two objects being placed in the same class if they were isomorphic via some member of Map(S). Dominates restricted to any equivalence class in via some member of Map(S). Dominates restricted to any equivalence class in Op(S) was shown to to exhibit a certain homogeniety relative to composition of elements in Map(S). Transitivity of dominates on an equivalence class was shown to be equivalent to an appropriate subset of Map(S) being alegbraically closed under composition. The equivalence classes determined by continuous triangular norms were characterized in terms of ordinal sums of semigroups. Author (GRA)

N83-34673# University of Central Florida, Orlando. Dept. of Mathematics and Statistics.

CHARACTERIZING DOMINATES ON A FAMILY OF TRIANGULAR NORMS

Howard Sherwood Oct. 1982 28 p refs Presented at the 19th Intern. Symp. on Functional Equations, Brittany, France, May 1981 Submitted for publication

(Grant AF-AFOSR-0124-81; AF Proj. 2304)

(AD-A128482; AFOSR-83-0386TR; Rept-20-1160-001) Avail: NTIS HC A03/MF A01 CSCL 12/1

In this paper the dominates relation was characterized on a family of semigroups on the unit interval. The dominates relation was shown to be transitive on that family. A t-norm is a function defined from I sub 2 to I = (0, 1) which is commutative, associative, nondecreasing in each place, having zero as a null element and one as an identity. GRA

N83-34674# North Carolina Univ., Chapel Hill. Center for Stochastic Processes.

ON LIMITING DISTRIBUTIONS OF ORDER STATISTICS WITH VARIABLE RANKS FROM STATIONARY SEQUENCES

Shihong Chen (Peking Univ.) Jan. 1983 31 p refs

(Contract F49620-82-C-0009; AF Proj. 2304)

(AD-A128484; AFOSR-83-0414TR; TR-25) Avail: NTIS HC A03/MF A01 CSCL 12/1

A limiting distribution is discussed under distributional mixing conditions. Author

N83-34675# Pennsylvania State Univ., University Park. Applied Research Lab.

FORTRAN IMPLEMENTATION OF COMPLEX LEAST SQUARES ADAPTIVE LATTICE ALGORITHM AS AN ALL ZERO INVERSE FILTER Interim Report

B. A. Cooper and L. H. Sibul 12 Nov. 1982 55 p refs

(Contract N00024-79-C-6043)

(AD-A128397; ARL/PSU/TM-82-219) Avail: NTIS HC A04/MF A01 CSCL 12/1

A complex least squares adaptive lattice algorithm was implemented on the ARL VAX/VNS computer as an inverse all zero filter. A FORTRAN program package is presented which also includes a recursive realization of a pole zero prefilter and an input signal generator. A series of examples is taken from the speech field, using the inverse filter to deconvolve speech signals produced by vocal tract models of varying complexity. The input to the prefilter is shown to be accurately recovered as the output of the inverse filter. R.J.F.

N83-34676# Maryland Univ., College Park. Computer Vision Lab.

ERROR-FREE PARALLEL HIGH-ORDER CONVERGENT ITERATIVE MATRIX INVERSION BASED ON p-ADIC APPROXIMATION

E. V. Krishnamurthy Nov. 1982 22 p refs

(Grant AF-AFOSR-3271-77; AF Proj. 2304)

(AD-A128418; AFOSR-83-0387TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The Newton-Schultz iterative scheme is reformulated in an algebraic setting to compute the exact inverse of a matrix (or the solution of a linear system of equations) over the ring of integers, with a high order or convergence, by using a finite segment p-ADIC representation of a rational. This method is divergence-free; it starts with the inverse of a given matrix over a finite field (called the priming step) and then iterates successively to construct, in parallel, the p-ADIC approximants (Hensel Codes) of the rational elements of the inverse matrix. The p-ADIC approximant is then converted back to the equivalent rational using the extended Euclidean algorithm. The method involves only parallel matrix multiplications and complementations and has a quadratic convergence rate. Extension to achieve higher order convergence is straightforward if parallel matrix arithmetic facilities for higher precision operands (in a prime base system) are available. Author (GRA)

N83-34677*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Inst. for Computer Applications in Science and Engineering.

COMPUTATIONAL METHODS FOR IDEAL COMPRESSIBLE FLOW Final Report

Bram vanLeer Jul. 1983 34 p refs Sponsored in part by Leiden Univ.

(Contract NAS1-15810)

(NASA-CR-172180; NAS 1.26:172180; Rept-83-38) Avail: NTIS HC A03/MF A01 CSCL 12A

Conservative dissipative difference schemes, the recognition and representation of discontinuities, and multidimensional methods are discussed. Author

N83-34678# Naval Research Lab., Washington, D. C. Acoustic Div.

A FORTRAN SUBROUTINE TO EVALUATE SPHERICAL BESSEL FUNCTIONS OF THE FIRST, SECOND, AND THIRD KINDS FOR COMPLEX ARGUMENTS Interim Report

J. P. Mason 23 May 1983 17 p

(RR0110841)

(AD-A128836; NRL-8705) Avail: NTIS HC A02/MF A01 CSCL 09/2

To determine analytically the acoustic scattering from absorbing spheres it is necessary to evaluate spherical Bessel functions of

the first, second, and third kinds for complex arguments, covering a range of integer orders from zero to a value approximately equal to the absolute value of the argument. A double-precision (G-format) FORTRAN subroutine, CSPJYD, has been written for the VAX-750 that will generate tables. GRA

N83-34679# Rockwell International Corp., El Segundo, Calif.
SUBSET SELECTION UNDER RANDOM CENSORSHIP
Jee Soo Kim Mar. 1983 20 p refs Presented at Conf.
(Grant NIEHS-5-T32-ES07011-05)
(DE83-013683; RFP-3519; CONF-830496-1) Avail: NTIS HC A02/MF A01

The maximum likelihood estimates of 0 sub i and its properties, the exact distribution of T, a selection procedure R and the P9CS/R), and properties of the rule R are discussed. Author

N83-34680# Los Alamos Scientific Lab., N. Mex.
EFFICIENT METHODS FOR TIME-ABSORPTION (ALPHA) EIGENVALUE CALCULATIONS
Thomas R. Hill Mar. 1983 54 p refs
(Contract W-7405-eng-36)
(DE83-009611; LA-9602-MS) Avail: NTIS HC A04/MF A01

The time-absorption eigenvalue calculation represents one of the options found in most discrete-ordinates transport codes. Several methods developed to improve the efficiency of this calculation are described. Two procedures, based on coarse mesh rebalance, to accelerate the alpha eigenvalue iterations are derived. Some simple modifications to the iteration convergence precisions and the iteration strategy reduce the number of unnecessary calculations in the early stages of the problem. A procedure to prevent code failures on alpha searches for subcritical systems is detailed. For the test problems examined, these methods resulted in convergence with one-fifth the number of iterations required for the standard eigenvalue search procedure. DOE

N83-34681# Tennessee Univ., Knoxville. Dept. of Nuclear Engineering.
DEVELOPMENT OF A NEW TWO-DIMENSIONAL CARTESIAN GEOMETRY NODAL MULTIGROUP DISCRETE-ORDINATES METHOD
Ronald Earl Pevey Jul. 1982 166 p refs
(Contract W-7405-eng-26)
(DE82-018570; ORNL/CSD/TM-182) Avail: NTIS HC A08/MF A01

The development and testing of a new family of methods for calculating the spatial dependence of the neutron density in nuclear systems described in two-dimensional Cartesian geometry is discussed. The energy and angular dependence of the neutron density is approximated using the multigroup and discrete ordinates techniques, respectively. The resulting FORTRAN computer code is designed to handle an arbitrary number of spatial, energy, and angle subdivisions. Any degree of scattering anisotropy can be handled by the code for either external source or fission systems. The basic approach is to (1) approximate the spatial variation of the neutron source across each spatial subdivision as an expansion in terms of a user-supplied set of exponential basis functions; (2) solve analytically for the resulting neutron density inside each region; and (3) approximate this density in the basis function space in order to calculate the next iteration flux-dependent source terms. In the general case the calculation is iterative due to neutron sources which depend on the neutron density itself, such as scattering interactions. DOE

N83-34682# Sandia Labs., Albuquerque, N. Mex.
BOOLEAN ALGEBRAIC ANALYSIS OF FIRE PROTECTION
Bernie L. Hulme, Ann W. Shiver, and Peter J. Slater (Alabama Univ., Huntsville) 1982 16 p refs Presented at MIT: Nucl. Power Reactor Safety, Bad Honnef, West Germany, 12 Apr. 1982
(Contract DE-AC04-76DP-00789)
(DE82-016810; SAND-82-0583C; CONF-820467-1) Avail: NTIS HC A02/MF A01

This paper describes a computational procedure which can be used to find minimum cost ways to protect the critical combinations of equipment from a single-source fire by protecting certain areas and strengthening certain barriers against fire. The procedure yields a complete set of optimum solutions by iteratively computing upper and lower bounds on the minimum cost. The fire protection sets evolve from Boolean algebraic computations which obtain minimum cost blocking sets associated with the lower bounds while the upper bounds are produced by maxflow-mincut calculations in a network. DOE

N83-34683# Argonne National Lab., Ill. Mathematics and Computer Science Div.
REDESIGNING LINEAR ALGEBRA ALGORITHMS
J. J. Dongarra 1983 10 p refs Presented at the Intern. Colloq. on Vector Parallel Computing in Sci. Appl., Paris, 17 Mar. 1983
(Contract W-31-109-eng-38)
(DE83-009463; CONF-830332-1) Avail: NTIS HC A02/MF A01

Many of the standard algorithms in linear algebra as implemented in FORTRAN do not achieve maximum performance on today's large-scale vector computers. The problem is examined in this paper. Alternative formulations of algorithms are constructed that do not lose the clarity of the original algorithm or sacrifice the FORTRAN portable environment, but do gain the performance attainable on these supercomputers. The resulting implementation not only performs well on vector computers but also increases performance on conventional sequential computers. DOE

N83-34684# Illinois Univ., Urbana. Dept. of Computer Science.
COMPUTING RUNGE-KUTTA STARTERS SYMBOLICALLY
James Purtilo Jan. 1983 32 p refs Sponsored in part by NSF
(Contract DE-AC02-76ER-02383)
(DE83-013431; DOE/ER-02383/T5; COO-2383-0092) Avail: NTIS HC A03/MF A01

The use of a Runge-Kutta method to start a multistep code in a initial value problem, as first developed by Gear, is reviewed in detail, elaborating on computational details and measuring the problem's complexity. Using this background, VAXIMA, a symbol manipulation program, is used for constructing and solving the necessary Runge-Kutta system. In addition, extensions made to VAXIMA to make more efficient the interaction between numerical and symbolic runtime environments are considered. A six stage starter at fourth order is explicitly derived, and the conditions for a fifth order starter are presented for application as either a true fifth order method or an estimator to the fourth order term. DOE

N83-34685# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Mathematische Verfahren und Datentechnik.
MAXIMUM LIKELIHOOD PARAMETER ESTIMATION FROM FLIGHT TEST DATA FOR GENERAL NONLINEAR SYSTEMS
Ravindra Jategaonkar and Ermin Plaetschke Mar. 1983 37 p refs Sponsored by German Academic Exchange Service Fellowship
(DFVLR-FB-83-14) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 13

The modified Newton-Raphson method for the maximum likelihood estimation of the stability and control derivatives of linear systems from flight test data was extended for the identification of general nonlinear systems. This extension overcomes the need of explicit sensitivity equations by approximating the sensitivity coefficients by finite differences. The program can handle very efficiently most nonlinear terms without requiring any changes in the estimating algorithm. Eight state variables, 12 output variables and 13 control input signals are handled. Fifty parameters and 2000 data points are estimated. Author (ESA)

N83-34686# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abt. Mathematische Verfahren und Darentechnik.
NONLINEAR PARAMETER ESTIMATION FROM FLIGHT TEST DATA USING MINIMUM SEARCH METHODS
Ravindra Jategaonkar and Ermin Plaetschke Mar. 1983 42 p refs
(DFVLR-FB-83-15) Avail: NTIS HC A03/MF A01; DFVLR,

Cologne DM 14,30

The maximum likelihood (ML) method, based on minimum search algorithms, for extraction of the stability and control derivatives from flight test data is discussed. General nonlinear multivariable model structure for equations of motion incorporating the nonlinearities due to state and control variables, as well as due to the parameters being estimated, are investigated. Comparisons with the quasi-linearization method and other numerical computational aspects of integration, and accuracy of parameter estimates are presented. Use of ML techniques for processing large amounts of flight test data in a routine manner remains restrictive, due to their slow convergence. Poor rate of convergence for the gradient as well as nongradient methods is irrespective of the number of parameters being estimated. Author (ESA)

N83-34687# Oxford Univ. (England). Dept. of Engineering Science.

ON APPROXIMATE INTEGRATION OF WIENER AND POISSON PROCESS DRIVEN STOCHASTIC DIFFERENTIAL EQUATIONS

C. J. Harris and Y. Magshsoodi 1983 56 p refs

(OUEL-1461/83) Avail: NTIS HC A04/MF A01

Mathematical analysis of two approaches to approximate integration of nonlinear Ito stochastic integral equations are extended to a class of equations, which as well as additive white noise contain random excitation of Poisson point (impulse) processes, which also additively disturb the system. Generalized recursive approximation algorithms are obtained for this class of stochastic integral equations in the scalar and multivariate cases. The approaches used are: in probability error criterion using truncation of the Taylor expansion of the integrands; and mean square error criterion using Taylor expansion of semigroup-transition operators of Markov processes. Results on convergence properties are presented and implementation and efficiency are investigated. Numerical results on simulations for mean and variance are compared. Author (ESA)

N83-34688# Oxford Univ. (England). Dept. of Engineering Science.

A MULTI-LOOP ROBUST/OPTIMAL DESIGN FOR A CLASS OF NONLINEAR SYSTEMS

Yang Yang and Basil Kouvaritakis 1983 27 p ref

(OUEL-1470/83) Avail: NTIS HC A03/MF A01

A robust-stable design is proposed for a class of nonlinear systems which are subjected to additive nonlinear perturbations. The design technique is based on the combination of various loop transformations that produce a stability equivalent system for which, unlike the case of the original system, it is possible to obtain upper bounds on the relevant gains. The small-gain-theorem ensures theoretically the stability of the design. A parametrization procedure is introduced to simplify the design, and in turn, the actual controllers are computed from the parametrized variables. Author (ESA)

N83-34689# Oxford Univ. (England). Dept. of Engineering Science.

A NEW ROBUST STABILITY CRITERION FOR LINEAR AND NONLINEAR MULTIVARIABLE FEEDBACK SYSTEMS

R. W. Daniel and B. Kouvaritakis Jun. 1983 36 p refs Sponsored by Central Electricity Generating Board and United Kingdom Science Research Council

(OUEL-1479/83) Avail: NTIS HC A03/MF A01

Eigenvalue inclusion regions are replaced by regions which are tight and lead to sufficient and necessary stability conditions for perturbed linear multivariable systems. The approach provides an exact assessment of gain margins. When applied to nonlinear system, the inclusion regions produce a necessary and sufficient test for the circle criterion conditions to hold in the multivariable case. The resulting stability criterion is an improvement on extensions of the circle criterion. Author (ESA)

N83-34077# Kyushu Univ., Fukuoka (Japan). Dept. of Electronics.

INVERTEDLY-BIFURCATING SELF-OSCILLATIONS IN THE MODIFIED HODGKIN-HUXLEY EQUATIONS

Kouichi Ryu, Shu Ezaki, and Kiyoshi Toko *In its* Mem. of the Fac. of Eng., Kyushu Univ., V. 43, No. 1 Mar. 1983 p 9-53 refs (For primary document see N83-34075 22-31)

Avail: NTIS HC A07/MF A01

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N83-34690# Florida State Univ., Tallahassee. Dept. of Statistics.

APPLICATIONS OF A UNIFIED THEORY OF MONOTONICITY IN SELECTION PROBLEMS

Roger L. Berger and Frank Proschan Mar. 1983 17 p refs

(Contracts F49620-82-K-0007; DAAG29-82-K-0168; AF Proj. 2304)

(AD-A128441; AFOSR-83-0422TR; AFOSR-83-156TR; FSU-STATISTICS-M652; TR-D-58-ARO) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this paper, the general monotonicity results concerning selection problems derived by Berger and Proschan are reviewed. They are then applied to several different formulations of the selection problem. These include comparison with a control and restricted subset selection problems. Several classes of selection rules previously proposed in the literature are shown to possess the monotonicity properties. In addition, a new class of rules for the restricted subset selection formulation is proposed and shown to possess the monotonicity properties. GRA

N83-34691# Florida State Univ., Tallahassee. Dept. of Statistics.

TESTING WHETHER NEW IS BETTER THAN USED OF A SPECIFIED AGE

Myles Hollander, Dong Ho Park (Temple Univ.), and Frank Proschan Jan. 1983 18 p refs

(Contract F49620-82-K-0007; AF Proj. 2304)

(AD-A128443; AFOSR-83-0416TR; AFOSR-82-153TR; FSU-STATISTICS-M646) Avail: NTIS HC A02/MF A01 CSCL 12/1

The authors introduce a new better than used at t sub o class of life distributions, where the survival probability at age 0 is greater than or equal to the conditional survival probability at specified age t sub o greater than 0. The dual class of new worse than used at t sub o life distributions is defined by reversing the direction of inequality. The authors preservation and nonpreservation properties of the two classes under various reliability operations. They then develop a test of the null hypothesis that a new item has stochastically the same residual lifelength as does a used item of age t sub o versus the alternative hypothesis that a new item has stochastically greater residual lifelength than does a used item of age t sub o. GRA

N83-34692# Stanford Univ., Calif. Dept. of Statistics.

AN ORTHOGONALLY INVARIANT MINIMAX ESTIMATOR OF THE COVARIANCE MATRIX OF A MULTIVARIATE NORMAL POPULATION

Akimichi Takemura Apr. 1983 22 p refs

(Contracts DAAG29-82-K-0156; N00014-75-C-0442)

(AD-A128843; ARO-19065.9-MA; TR-9) Avail: NTIS HC A02/MF A01 CSCL 12/1

In the problem of estimating the covariance matrix of a multivariate normal population James and Stein obtained a minimax estimator by considering the best invariant estimator with respect to the triangular group. In this paper its authors propose an orthogonally invariant estimator obtained by averaging the minimax estimator with respect to the invariant measure on the orthogonal group. Explicit forms of the proposed estimator are given for dimensions 2 and 3. Risk is evaluated for various population covariance matrices and it shows a substantial improvement over

the minimax estimator for a wide range of population covariance matrices. Author (GRA)

N83-34693# Stanford Univ., Calif. Dept. of Statistics.
ORTHOGONAL EXPANSION OF QUANTILE FUNCTION AND COMPONENTS OF THE SHAPIRO-FRANCIA STATISTIC
Akimichi Takemura Apr. 1983 22 p refs
(Contract DAAG29-82-K-0156)
(AD-A128842; ARO-19065.8-MA; TR-8) Avail: NTIS HC A02/MF A01 CSCL 12/1

Let F be a distribution function on the real line having finite variance. Then the quantile function F(-1) belongs to L(2)[0,1]. Hence F(-1) can be expanded in a Fourier series with respect to an appropriate complete orthonormal system of L(2)[0,1]. When F is taken to be an empirical distribution function F sub n, this leads to a decomposition of the Shapiro-Francia test statistic. The technique is applicable to a general distribution and tests of exponentiality and uniformity are discussed in addition to tests of normality. M.G.

N83-34694# Maryland Univ., College Park. Dept. of Mathematics.
MULTIVARIATE DEPENDENT RENEWAL PROCESSES
Eric Slud Jan. 1983 28 p refs
(Grant AF-AFOSR-0187-82; AF Proj. 2304)
(AD-A128818; MD83-1-ES; TR-83-1; AFOSR-83-0293TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

A new class of reliability point-process models for dependent components is introduced. The dependence is expressed through a regression, following a form suggested for survival data analysis involving the current life-length of the components. After formulating the current-life process as a Markov process with stationary transitions and stating some general results on asymptotic behavior, the authors describe the stationary distributions in some bivariate examples. Finally, they discuss statistical inference for the new models, exhibiting and justifying full- and partial-likelihood methods for their analysis. GRA

N83-34695# Illinois Univ., Chicago. Dept. of Quantitative Methods.
USE OF MODEL-SEGMENTATION CRITERIA IN CLUSTERING AND SEGMENTATION OF TIME SERIES AND DIGITAL IMAGES
Stanley L. Sclove 5 May 1983 9 p refs Presented at the 44th Sess. of the Intern. Statist. Inst., Madrid, 12-22 Sep. 1983
(Contract DAAG29-82-K-0155)
(AD-A128840; UIC/DQM-A83-3; ARO-19085.4-MA) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper treats the development and use of criteria for model selection, particularly for the choice of the number of groups (clusters) in the analysis of multivariate data and of the number of classes of segments in the segmentation of time series and digital images. Criteria such as those of Akaike, Schwarz and Kashyap are considered. Author (GRA)

N83-34696# Oak Ridge National Lab., Tenn. Mathematics and Statistics Research Dept.
EXPERT OPINION AND RANKING METHODS
V. R. R. Uppuluri Mar. 1983 23 p refs
(Contract W-7405-eng-26)
(DE83-007160; NUREG/CR-3115; ORNL/CSD/TM-201) Avail: NTIS HC A02/MF A01

Suppose we have k objects and wish to rank them according to a characteristics. A judge compares these objects two at a time and indicates whether one object is better or worse or equal to another objects. This data is analyzed by log least squares procedure and the lambda sub max procedure suggested by Saaty. It is shown by examples, how one can incorporate the data from several judges to obtain a ranking of the objects. Finally, the case when a judge compares the objects two at a time and indicates the probability that one object is better than another object is considered, and it is shown how one can get a ranking of the objects. DOE

N83-34697# Argonne National Lab., Ill.
MONTE CARLO SMALL-SAMPLE PERTURBATION CALCULATIONS
Uri Feldman, Ely Gelbard, and Roger Blomquist 1983 11 p refs Presented at the Am. Nucl. Soc. Topical Conf. on Computational Methods, Salt Lake City, 28 Mar. 1983
(Contract W-31-109-eng-38)
(DE83-009588; CONF-830304-17) Avail: NTIS HC A02/MF A01

Two different Monte Carlo methods were developed for benchmark computations of small-sample-worths in simplified geometries. The first is basically a standard Monte Carlo perturbation method in which neutrons are steered towards the sample y roulette and splitting. One finds, however, that two variance reduction methods are required to make this sort of perturbation calculation feasible. First, neutrons that have passed through the sample must be exempted from roulette. Second, neutrons must be forced to undergo scattering collisions in the sample. Even when such methods are invoked, however, it is still necessary to exaggerate the volume fraction of the sample by drastically reducing the size of the core. The benchmark calculations are then used to test more approximate methods, and not directly to analyze experiments. In the second method the flux at the surface of the sample is assumed to be known. Neutrons entering the sample are drawn from this known flux and tracking by Monte Carlo. The effect of the sample or the fission rate is then inferred from the histories of these neutrons. The characteristics of both of these methods are explored empirically. DOE

N83-34698# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
THE GROWTH AND COMPOSITION OF BRANCHING POPULATIONS
Peter Jagers and Olle Nerman 1983 57 p refs Sponsored by Swedish Natural Science Research Council
(CTH-Math-1983-9; ISSN-0347-2809) Avail: NTIS HC A04/MF A01

Single type general branching populations developing by individuals reproducing according to i.i.d. point processes on the positive reals, interpreted as the individuals' ages, are discussed. Such a population can be measured or counted as those born, those alive or in sub-phases of life, e.g., special choices of reproduction point process and counting yield the classical Galton-Watson or Bellman-Harris process. The exponential growth of such populations, in the supercritical case, and the asymptotic stability of composition according to very general ways of counting are considered. A strict definition of a stable population in exponential growth, as a probability space, a margin of which is the well-known stable age distribution, is obtained. Author (ESA)

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N83-34699*# Brown Univ., Providence, R. I. Div. of Applied Mathematics.
THE LINEAR REGULATOR PROBLEM FOR PARABOLIC SYSTEMS Final Report
H. T. Banks and K. Kunisch Jul. 1983 31 p refs
(Contracts NAS1-15810; NAS1-16394; DAAG29-79-C-0161; Grant NSF MCS-82-05335)
(NASA-CR-172176; NAS 1.26:172176; Rept-83-34; AFOSR-8--0198TR) Avail: NTIS HC A03/MF A01 CSCL 12B

An approximation framework is presented for computation (in finite imensional spaces) of Riccati operators that can be guaranteed to converge to the Riccati operator in feedback controls for abstract evolution systems in a Hilbert space. It is shown how these results may be used in the linear optimal regulator problem for a large class of parabolic systems. M.G.

N83-34700# Ballistic Research Labs., Aberdeen Proving Ground, Md.
GED: AN INTERACTIVE SOLID MODELING SYSTEM FOR VULNERABILITY ASSESSMENTS
Michael J. Muuss, Keith A. Applin, J. Robert Suckling, Gary S. Moss, Earl P. Weaver, and Charles A. Stanley Mar. 1983 48 p refs
(AD-A126657; AD-F300217; ARBRL-TR-02480) Avail: NTIS HC A03/MF A01 CSCL 19/4

A user manual for the Graphics Editor (GED) system is discussed. The process of viewing and editing a description using GED is covered in detail. The internal data structure is also covered, as it is an important part in the overall design of the GED system. Author

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N83-34701*# National Aeronautics and Space Administration, Washington, D. C.
ON ORTHOGONAL EXPANSIONS OF THE SPACE OF VECTOR FUNCTIONS WHICH ARE SQUARE-SUMMABLE OVER A GIVEN DOMAIN AND THE VECTOR ANALYSIS OPERATORS
E. B. Bykhovskiy and N. V. Smirnov Apr. 1983 66 p refs Transl. into ENGLISH from Mat. Vopr. Gidrodinamiki i Magnitnoy Gidrodinamiki dlya Vyazkoy Neszhimayemoy Zhidkosti, Mat. Inst. Imeni V. A. Steklov Tr. (USSR), no. 59, 1960 p 5-36 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-77051; NAS 1.15:77051) Avail: NTIS HC A04/MF A01 CSCL 12A

The Hilbert space L2(omega) of vector functions is studied. A breakdown of L2(omega) into orthogonal subspaces is discussed and the properties of the operators for projection onto these subspaces are investigated from the standpoint of preserving the differential properties of the vectors being projected. Finally, the properties of the operators are examined. Author

N83-34702# Technische Universitaet, Brunswick (West Germany). Inst. fuer Mathematik.
FUZZY CLASSIFICATION AND ANALYSIS OF TIME-DEPENDENT DATA
Gerd-Holger Lietke, Lothar Schueler, and Hans Wolff Bonn Bundesministerium fuer Verteidigung 1982 45 p refs In GERMAN; ENGLISH summary
(BMVg-FBWT-82-9) Avail: NTIS HC A03/MF A01; DOKLENTBw, Bonn DM 40

Fuzzy-set theory and Fuzzy-cluster analysis are used for a classification procedure analoguous to that using trainings-samples. Discriminance-analysis, estimation, and maximum likelihood methods are examined. Time-dependent densities are estimated: first starting from a mixture of individual densities and by a procedure of trends for moments of random variables that are then used for estimating the actual densities. The procedures were tested extensively by simulation. Author (ESA)

N83-34703# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
A FATOU THEOREM FOR EIGENFUNCTIONS OF THE LAPLACE-BELTRAMI OPERATOR IN A SYMMETRIC SPACE
Peter Sjoergen 1983 17 p refs
(CTH-Math-1983-6; ISSN-0347-2809) Avail: NTIS HC A02/MF A01

For X a Riemannian symmetric space, a representation for all positive eigenfunctions of the Laplace-Beltrami operator delta in X was found. The Martin boundary obtained is the product of the Furstenberg boundary of X and a subset of a sphere. Given an integrable function f on this Martin boundary, there is an associated eigenfunction u of delta. The problem of recovering f as a pointwise limit of u, or rather u divided by a normalizing function is posed. The limit should then be taken along geodesic curves corresponding to boundary points. It is proved that almost all values of any integrable f are limits in this way. The proof goes via the corresponding maximal function. Author (ESA)

N83-34704# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
HOMOGENEITY AND THE STRONG MARKOV PROPERTY
Olav Kallenberg 1983 29 p refs
(CTH-Math-1983-7; ISSN-0347-2809) Avail: NTIS HC A03/MF A01

The strong Markov property splits naturally into an independence and a homogeneity part, but the former is actually a consequence of the latter. More generally, a process X which is homogeneous in a Borel set B for stopping times tau with X sub tau lying in a certain closed recurrent set F implies B is at least conditionally regenerative in B. Author (ESA)

N83-34705# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
THE EXTREMAL PSH FOR THE COMPLEMENT OF CONVEX, SYMMETRIC SUBSETS OF R TO THE N
Magnus Lundin 1983 10 p refs
(CTH-Math-1983-8) Avail: NTIS HC A02/MF A01

A fairly explicit formula is given for the extremal function phi sub E, where E is a convex set, symmetric with respect to O and contained in the function set R to the N, considered on a subset of C to the N; here R is the set of real and C the set of complex numbers and N is a positive integer. If phi sub E is the supremum over all polynomials in N complex variables with norm $<$ or $=$ 1, it is proved that phi sub E is equal to psi sub E, where psi sub E at a point z is the supremum over the unit sphere in R to the N of the absolute value of the function F whose value at the pair (Ksi, z) Ksi a point in the unit sphere of R to the N, is given in terms of a function a (Ksi). As a corollory a convexity result is obtained. Author (ESA)

N83-34706# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Systemes et Communications.
SPECTRAL FACTORIZATION OF WIDE SENSE STATIONARY PROCESSES ON Z SQUARED
Hayri Korezlioglu and Philippe Loubaton 1983 31 p refs
(ENST-D-83001) Avail: NTIS HC A03/MF A01

A theorem on canonical spectral factorization is proved starting from the canonical representation of a nondeterministic process, set in a framework analoguous to one-parameter prediction theory, in order to study prediction of wide-sense stationary processes on the plane. The theorem is based on one-parameter spectral factorization techniques borrowed from the theory of analytic functions on the unit disk of C, the complex numbers. A class of processes having a quarter-plane canonical representation in terms of its innovations can be studied via the theory of analytic functions on the unit bidisk of the complex plane C square. The case when the causal representation is not causally invertible is considered as is Wold decomposition and filtering. Author (ESA)

N83-34707# Electricite de France, Chatou. Div. Metaux Liquides.
SOLUTION OF VARIOUS PROBLEMS BY THE CAUCHY METHOD OF CHARACTERISTICS [RESOLUTION DE DIVERS PROBLEMES PAR LA METHODE DE CARACTERISTIQUES DE CAUCHY: APPLICATION AU CODE CARESO]
D. Barau 22 Dec. 1981 21 p refs In FRENCH
(HT-32/81/32) Avail: NTIS HC A02/MF A01

The hypersurface characteristic of a differential operator, the solution of nonlinear first order equations, and the equations of a perfect isentropic fluid are discussed. Hamilton systems, optics and mechanics applications of the method of characteristics, and Riemann invariants are considered. The discretized equations used by the one dimensional code CARESO are presented.
Author (ESA)

N83-34708# Centre National de la Recherche Scientifique, Marseilles (France). Dept. de Fisica Teorica.
REDUCED MODEL FOR LARGE N CONTINUUM FIELD THEORIES
A. Gonzalez-Arroyo and C. P. KorthalsAltes (CNRS, Marseille) May 1983 8 p refs
(FTUAM-83-16) Avail: NTIS HC A02/MF A01

A reduced model for large N gage and nongage field theories, in even space-time dimensions is formulated. The model is regularized in a rotationally invariant way, and the equivalence of the model with the ordinary one is exhibited in perturbation theory. The N enters as a rescaling parameter in the coupling constants and commutation relations of the hermitian operators. It is unrelated to the dimension of the Hilbert space where the field variables act. Author (ESA)

N83-34709# Sheffield Univ. (England). Dept. of Control Engineering.
ON EIGENVALUES, EIGENVECTORS AND SINGULAR VALUES IN ROBUST STABILITY ANALYSIS
D. H. Owens and A. Chotai Feb. 1983 14 p refs
(Grant SRC-GR/B/23250)
(RR-216) Avail: NTIS HC A02/MF A01

Direct incorporation of structured uncertainty in the elements of a multivariable plant into robust stability analyses is described. The use of characteristic locus structure of the nominal plant is demonstrated and it is seen that skewness of the eigenvector matrix has a significant effect on robustness by reducing stability margins. In the worst cases, the techniques are highly sensitive to uncertainty in the vicinity of branch points. The use of unitary transformations removes the problem in the use of eigenvalues and singular values, but at the expense of increased complexity of the result as the transformations interact with the uncertainty to effect stability margins. This is to be expected, however, as eigenvalue and/or singular value information on nominal plant dynamics is not defined in the natural input-output basis.
Author (ESA)

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N83-34710# California Univ., Livermore. Lawrence Livermore Lab.
SUMMARY OF PARAMETERS AND MEASUREMENT TECHNIQUES FOR THE SELECTION, CHARACTERIZATION, AND MONITORING OF LOW-LEVEL WASTE-DISPOSAL SITE
C. Minichino, G. Armantrout, and G. Holladay Sep. 1982 54 p refs
(Contract W-7405-eng-48)
(DE83-002153; NUREG/CR-2964; UCID-19462) Avail: NTIS HC A04/MF A01

The parameters and measurement techniques needed for the proper selection, characterization and monitoring of a low-level waste disposal site are discussed. The parameters needed are identified and prioritized according to their relative importance. Current measurement techniques for these parameters are assessed in terms of how well established they are in practice and how much difficulty their implementation presents. Parameters important in both preoperational characterization and operational and post-closure monitoring are included. DOE

N83-34711# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.
RAMP RATE SENSITIVITES OF SEVERAL SUPERCONDUCTING DIPOLE MAGNETS OPERATED IN He I AND SUPERFLUID He II
S. Caspi, W. S. Gilbert, and J. B. Rechen Nov. 1982 6 p refs Presented at the Appl. Superconductivity Conf., Knoxville, Tenn., 28 Nov. - 3 Dec. 1982
(Contract DE-AC03-76SF-00098)
(DE83-007021; LBL-14445; CONF-821108-24) Avail: NTIS HC A02/MF A01

The quench current of a superconducting dipole magnet decreases from its slow ramp value as the current ramp rate is increased, due to heat buildup in the coil winding. the ramp rate dependence was measured for several superconducting dipoles in both normal He 1 and in superfluid He 2. The heat generated by charging fields was measured for several magnets in He 2, where particularly sensitive and accurate measurements can be made of any heat input to the essentially isothermal helium bath by its temperature rise. Previously measured values of heat transfer are applied to the data from one magnet to explain its observed behavior. It was concluded that at a given cycle rate, a superfluid He 2 cooled superconducting accelerator can operate closer to the short sample limit of the magnet's superconductor than can a corresponding He 1 cooled machine. DOE

N83-34712# Technische Univ., Berlin (West Germany). Inst. fuer Mechanik.
AN AXIOMATIC APPROACH TO CLASSICAL DYNAMICS BASED ON AN OBJECTIVE POWER FUNCTIONAL
Albrecht Bertram 1983 28 p refs
(FB-1) Avail: NTIS HC A03

Nonrelativistic kinematics is outlined, and a principle of determinism, which states the existence of a balance of an (objective) primitive concept, called power is introduced. As an auxiliary concept, the power is extended by means of a virtual power, which enables forces and torques to be introduced. Their transformation properties are studied, and their balance laws are derived from assumptions on the virtual power. While all these concepts are defined on the moved body as a whole, the field formulations are introduced along the traditional lines of the stress principle of Euler and Cauchy. The concepts of measure theory on bodies and subbodies are omitted. The objectivity of stresses is demonstrated. The two forms of the so-called principle of material objectivity are kept strictly distinct. Author (ESA)

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution*.

N83-34713*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RESIDENTS' ANNOYANCE RESPONSES TO AIRCRAFT NOISE EVENTS
Thomas K. Dempsey, David G. Stephens, James M. Fields (Bionetics Corp.), and Kevin P. Shepherd (Bionetics Corp.) Sep. 1983 42 p refs
(NASA-TP-2121; L-15595; NAS 1.60:2121) Avail: NTIS HC A03/MF A01 CSCL 20A

In a study conducted in the vicinity of Salt Lake City International Airport, community residents reported their annoyance with individual aircraft flyovers during rating sessions conducted in their homes. Annoyance ratings were obtained at different times of the day. Aircraft noise levels were measured, and other characteristics of the aircraft were noted by trained observers. Metrics commonly used for assessing aircraft noise were compared, but none performed significantly better than A-weighted sound pressure level. A significant difference was found between the ratings of commercial jet aircraft and general aviation propeller aircraft, with the latter being judged less annoying. After the effects of noise level were accounted for, no significant differences were found between the ratings of landings and takeoffs. Aircraft noise annoyance reactions are stronger in lowered ambient noise conditions. This is consistent with the theory that reduced nighttime and evening ambient levels could create different reactions at different times of day. After controlling for ambient noise in a multiple regression analysis, no significant differences were found between the ratings

of single events obtained during the three time periods: morning, afternoon, and evenings. Author

N83-34714# Naval Postgraduate School, Monterey, Calif.
PRELIMINARY INVESTIGATION OF THE ENVIRONMENTAL SENSITIVITY OF ACOUSTIC SIGNAL TRANSMISSION IN THE WAVENUMBER DOMAIN WITH RESPECT TO SOURCE DEPTH DETERMINATION M.S. Thesis
Billy Barton Stamey, Jr. Dec. 1982 119 p refs
(Contract N68462-82-WR-200099)
(AD-A126688) Avail: NTIS HC A06/MF A01 CSCL 17/1

The Wavenumber Technique (WT) is a relatively new method of underwater sound transmission analysis. One aspect, source depth determination, is studied to evaluate its validity and test environmental and acoustic sensitivity. The horizontal wavenumber spectrum is analyzed to determine null spacings in wavenumber space, which indicates source depth by the Lloyd's Mirror interference effect. Comparison of this theory with cases of an isospeed sound profile, fully absorbing bottom, and flat totally reflecting surface shows excellent agreement for several parametric variations. Cases with realistic sound speed profiles and partially bsorbing bottoms generally agree with theory, but a distinct bias is observed. Source depth determination curves, which relate scaled wavenumber spectral intensity null spacing to the source depth, are presented for comparison with theory and sensitivity analysis. An example is given for suggested application of source depth determination. Author

N83-34715# Naval Underwater Systems Center, New London, Conn.
COEFFICIENT OF VARIATION SPECTRAL ANALYSIS: AN APPLICATION TO UNDERWATER ACOUSTICS
Peter D. Herstein and Robert F. LaPlante 3 May 1983 18 p Presented at the American Inst. of Aeronautics and Astronautics 8th Aeroacoustics Conf., Atlanta, 11-13 Apr. 1983
(ARPA Order 2976)
(AD-A128191; NUSC-TD-6915) Avail: NTIS HC A02/MF A01 CSCL 20/1

Acoustic noise in the ocean is often described in terms of its power spectral density. Just as in other media, this noise consists of both narrowband and broadband frequency components. A major problem in the analysis of power spectral density measurements is distinguishing between narrowband spectral components of interest and contaminating narrowband components. In this paper, the use of coefficient of variation (Cv) spectrum is examined as an adjunct to the conventional power spectrum to distinguish narrowband components of interest from contaminating components. The theory of the Cv is presented. Coefficients for several classical input distributions are developed. It is shown that Cv spectra can be easily implemented as an adjunct procedure during the computation of the ensemble of averaged power spectra. Power and Cv spectra derived from actual at-sea sonobuoy measurements of deep ocean ambient noise separate narrowband components from narrowband lines of interest in the ensemble of averaged power spectra, these acoustic components of interest can be distinguished in the Cv spectra. Author (GRA)

N83-34716# Long (Marshall)/Acoustics, Santa Monica, Calif.
EVALUATION OF NOISE ASSOCIATED WITH GEOTHERMAL-DEVELOPMENT ACTIVITIES Final Report, 31 Jul. 1979 - 30 Apr. 1982
Marshall Long and Richard Stern 30 Apr. 1982 137 p refs 2 Vol.
(Contract DE-AC01-79EV-06200)
(DE83-002536; DOE/EV-06200/T1-Vol-1) Avail: NTIS HC A07/MF A01

The current state of noise generation, suppression, and mitigation techniques associated with geothermal development are discussed. A description of the geothermal drilling process is included as well as an overview of geothermal development activies in the United States. Noise sources at the well site, along geothermal pipelines, and at the power plants are considered. All data presented are measured values by workers in the field and by Marshall Long/Acoustics. One particular well site was monitored for a period of 55 continuous days, and includes all sources of noise from the time that the drilling rig was brought in until the time that it was moved off site. A complete log of events associated with the drilling process is correlated with with the noise measurements including production testing of the completed well. Data are also presented which compare measured values of geothermal noise with federal, state, county, and local standards. A section on control of geothermal noise is also given. DOE

N83-34717# California Univ., Livermore. Lawrence Livermore Lab.
DIGITAL SIGNAL-PROCESSING TECHNIQUES USED FOR IMPROVING THE RESOLUTION OF B-SCANS IN 1 SECOND OR LESS PER WAVEFORM
Ronald L. McKinney, Don Boyd, Aki Kuramoto, and Bill McDonald 1983 18 p refs Presented at the 14th Symp. on Nondestructive Evaluation, San Antonio, Tex., 19-21 Apr. 1983
(Contract W-7405-eng-48)
(DE83-009810; UCRL-88942; CONF-830430-1) Avail: NTIS HC A02/MF A01

The application of several signal processing techniques for improved resolution of ultrasonic B-scans is complete. Techniques such as split spectrum processing, analytic signal magnitude, and various windowing procedures were implemented. A transducer pulser and receiver are used in conjunction with a data acquisition system to send, receive, digitize, and store ultrasonic waveforms. The digitized waveforms are processed using an array processor. The results have proved favorable both in processing time and in additional information provided by the techniques. The array processor is installed in a DEC 11/23 computer and is accessed using simple FORTRAN calls. All of the processing techniques require at least 2 FFTs and one of them, split spectrum processing, requires as many as 20 FFTs per waveforms. Even with this extensive computation each technique is implemented in 1 second or less. DOE

N83-34718# Knolls Atomic Power Lab., Schenectady, N. Y.
HIGH-RESOLUTION IN-SITU ULTRASONIC CORROSION MONITOR
R. J. Grossman Dec. 1982 26 p refs
(Contract DE-AC12-76SN-00052)
(DE83-010057; KAPL-4162) Avail: NTIS HC A03/MF A01

As component corrosion becomes an increasingly important consideration in lifetime reliability, means to predict and measure that corrosion also become more important. The development of an Ultrasonic Corrosion Monitor which can provide a continuous, high resolution indication of in-situ corrosion film buildup is described. The capability to measure film thickness increases smaller than 0.1 micron (0.004 mil) makes the Ultrasonic Corrosion Monitor a valuable tool for understanding, characterizing, and monitoring component corrosion. The analytical foundation for the ultrasonic technique and the results of a proof of principle experiment is presented. DOE

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N83-34719# Junta de Energia Nuclear, Madrid (Spain). Dept. de Investigation Basica.
MONTE CARLO CALCULATION OF THE TOTAL PROBABILITY FOR GAMMA-RAY INTERACTION IN TOLUENE
A. Grau Malonda and E. Garcia-Torano 1983 26 p refs In SPANISH; ENGLISH summary
(JEN-540; ISSN-0081-3397) Avail: NTIS HC A03/MF A01

Interaction and absorption probabilities for gamma-rays with energies between 1 and 1000 KeV were computed and tabulated. Toluene based scintillator solution was assumed in the computation. Both point sources and homogeneously dispersed radioactive material were assumed. These tables may be applied to cylinders

with radii between 1.25 cm and 0.25 cm and heights between 4.07 cm and 0.20 cm. Author

N83-34720# Johns Hopkins Univ., Baltimore, Md. Dept. of Chemistry.
THEORETICAL STUDIES OF EXCITED STATE ENERGY TRANSFER AND RADIATIVE PROPERTIES OF TRANSIENT SPECIES USING MCSCF/CI METHODS Final Report
David R. Yarkony 31 Dec. 1982 12 p refs
(Grant AF-AFOSR-0073-79)
(AD-A126795; AFOSR-83-0175TR) Avail: NTIS HC A02/MF A01 CSCL 20/10

The broad goal of this research program was to study excited state chemistry, and electronic energy transfer and chemical energy redistribution processes, using the methods of ab initio electronic structure theory. Radioactive of metastable atomic species, electronic structure, bonding and optical properties of the alkaline earth oxides were studied. B.W.

N83-34721# Purdue Univ., Lafayette, Ind. Dept. of Chemistry.
COMPARISONS BETWEEN THEORETICAL AND EXPERIMENTAL DEUTERIUM ISOTOPE EFFECTS FOR SOME OUTER-SPHERE ELECTROCHEMICAL REACTIONS
Michael J. Weaver and Tomi T.-T. Li Mar. 1983 18 p refs Submitted for publication
(Contract N00014-83-K-0086)
(AD-A126726; TR-13) Avail: NTIS HC A02/MF A01 CSCL 07/4

Experimental deuterium isotope effects upon the rates of outer-sphere electrochemical exchange reactions involving aguo and ammine complexes are compared with the predictions of contemporary theories which take into account nuclear tunneling from inner-shell vibrational modes. The isotope rate ratios calculated by considering nuclear tunneling of metal-ligand vibrational modes are in most cases much smaller than the observed rate ratios. Significant additional contributions may arise from nuclear tunneling associated with internal ligand stretching modes, although this is estimated to be unlikely to account for the very large isotope effect observed for hexaaquochromium(III)/(II). The disparities seem between theory and experiment are speculated to be due to a contribution to the outer-shell reorganization energy from reorientation of hydrogen-bound solvent molecules. This conclusion is supported by the marked disparities seen between the relative isotope rate ratios for corresponding electrochemical and homogeneous reactions in comparison with the predictions of the dielectric continuum model. Author

N83-34722# Naval Postgraduate School, Monterey, Calif.
CERENKOV RADIATION
Ahmet Saglam Dec. 1982 70 p refs
(AD-A126753) Avail: NTIS HC A04/MF A01 CSCL 20/8

Cerenkov radiation is calculated for electron beams which exceed the velocity of radiation in a nondispersive dielectric medium. The electron beam is assumed to be bunched as emitted from a travelling wave accelerator, and the emission region is assumed to be finite. Predictions include (1) emission at harmonics of the bunch rate, (2) coherence of radiation at low frequencies, (3) smearing of the emission angle for finite emission regions, (4) explicit evaluation of power spectrum in terms of bunch dimensions. The results of theory are applied to microwave emission from fast electrons in air for different lengths of the air path. Problems encountered during the experiment are discussed and suggestions for continuing work are provided. Author

N83-34723# Rhode Island Univ., Kingston. Dept. of Chemistry.
THE GORDON CONFERENCE ON MOLECULAR ELECTRONIC SPECTROSCOPY Final Report
Robin M. Hochstrasser 1982 11 p refs Conf. held at Wolfesboro, N.H., 8-13 Aug. 1982
(Grant AF-AFOSR-0283-82)
(AD-A126823; AFOSR-83-0217TR) Avail: NTIS HC A02/MF A01 CSCL 07/4

Fields covered included the spectra and structure of small molecules and ions including laser techniques of high resolution spectroscopy. An important achievement was the bringing together of research workers condensed phases with those usually concerned with isolated molecule properties. Thus sessions were held on energy transfer and ultrahigh resolution spectroscopy in various types of solids and glasses, in addition to a number of lectures on intramolecular dynamics, photophysics and vibrational energy redistribution. A complete session was devoted to multiphoton ionization spectroscopy of moderately large molecules. The topic of large molecule and cluster structure and dynamics was further brought out through the session on spectroscopy in supersonic jets. Author

N83-34724# Oregon Univ., Eugene. Dept. of Physics.
FOCK-TANI REPRESENTATION FOR ELECTRON-HYDROGEN SCATTERING
M. D. Girardeau and J. D. Gilbert Apr. 1983 11 p refs
(Contract N00014-81-K-0759; NR Proj. 394-055)
(AD-A128423; QTF-5) Avail: NTIS HC A02/MF A01 CSCL 12/1

A canonical transformation method previously applied to positron-hydrogen scattering is used to derive the Fock-Tani Hamiltonian for electron-hydrogen scattering. The H- bound and resonance channels are exhibited as explicit terms in the second-quantized interaction. Author (GRA)

N83-34725# Minnesota Univ., Minneapolis. Dept. of Chemistry.
REACTIONS OF IONS WITH ATOMIC AND MOLECULAR FREE RADICALS Final Report, 1 May 1975 - 30 Nov. 1982
W. Ronald Gentry Dec. 1982 78 p refs
(Contract DE-AC02-76ER-02640)
(DE83-009371; DOE/ER-02640/14) Avail: NTIS HC A05/MF A01

In order to investigate the dynamics of reactions between two reactants having open-shell electronic configurations, a comprehensive experimental and theoretical study was made of the reactions H2() + X (FEMALE) XH() + H, in which X is a first-row atom. None of these reactions had ever before been observed. The merged molecular beam technique was used to measure the energy dependence of the microscopic reaction cross sections over the range of relative kinetic energies from 0.002 eV to 30 eV, with an absolute accuracy of typically 5%. Detailed information on the reaction dynamics and energetics was also obtained by high-resolution energy analysis of the product ions. The theoretical interpretation of the low-energy reaction cross sections was based on long-range interaction potentials calculated for the charge-quadrupole and charge-induced dipole contributions, which are sensitive to the projection quantum numbers for the electronic angular momentum of the atom. The powerful combination of experimental and theoretical techniques permitted the separate reaction probabilities per capture collisions to be deduced for (UC OMEGA) and Pi states of the reactants, and made possible the clarification of the role which electronic nonadiabaticity plays in the reactions of two free radicals. In the last stage of this project, attention was turned to the study of state-to-state molecular energy transfer using a noval pulsed molecular beam instrument with laser detection of scattered products. DOE

N83-34726# California Univ., Berkeley. Lawrence Berkeley Lab.
TOTAL AND INCLUSIVE HADRON PRODUCTION BY e(+)e(-) ANNIHILATION AT SQUARE ROOT OF S = 5.2, 6.5 AND 29.0 GeV Ph.D. Thesis
James Fraser Patrick Jul. 1982 116 p refs
(Contract DE-AC03-76SF-00098)
(DE83-005872; LBL-14585) Avail: NTIS HC A06/MF A01

Measurements are presented of R, the ratio of the total hadronic cross section to the cross section for mu pair production, and of the inclusive charged particle momentum distribution so sigma/dx for e+e- annihilation at center of mass energies of 5.2, 6.5, and 29.0 GeV. The ratio R is found to be approximately 3.9, consistent with quark-parton model expectations, at each of the three energies with an estimated systematic uncertainty of 6%.

The inclusive cross sections show significant deviation from the scaling behavior predicted by the quark-parton model. DOE

N83-34727# Ames Lab., Iowa. Dept. of Chemistry.
PHOTOIONIZATION-EFFICIENCY STUDIES OF SOME SIMPLE INORGANIC MOLECULES Ph.D. Thesis - Iowa State Univ.
Steven Howard Linn Dec. 1982 198 p refs
(Contract W-7405-eng-82)
(DE83-004860; IS-T-1033) Avail: NTIS HC A09/MF A01

The supersonic molecular beam method yielded more precise values of the ionization energies (IEs) of HgX2(+) (X = Cl, Br, and I) to within + or - 3 MeV. Lower resolution studies of the HgX2 fragment ions were undertaken and values of the binding energies of HgX(+) and HgX were calculated from the measured appearance energies (AEs) of HgX and X(+). In addition, photoionization, studies of the CO2, N2O, CO, N2, NO, and O2 dimers and clusters yielded the IEs of (CO2)/sub n = 2-4/, (N2O)2, (CO)/sub n = 2,3/, (N2)/sub n = 2,3/, and (NO)/sub n = 2-6/, and the AEs of N2O3(+) from (N2O)2, O3(+) from (O2)2, O5(+) from (O2)3, and O7(+) from (O2)4. Analysis of the PIE curves of (CO2)2(+) and (N2O)2 indicates that electronic predissociation may be an important dissociation mechanism for some Rydberg dimers. Solvation energies of NO(+) by one to five NO molecules were determined. Analysis of the PIE spectra for O3(+), O5(+) and O7(+), provided insights concerning the internal energy effects on ion-molecular half reactions. DOE

N83-34728# Rice Univ., Houston, Tex. Nuclear Labs.
NUCLEAR STRUCTURE AT INTERMEDIATE ENERGIES Progress Report, 1982 - 1983
G. C. Phillips and G. S. Mutchler 28 Oct. 1982 59 p refs
(Contract DE-AS05-81ER-40032)
(DE83-002960; DOE/ER-40032/3) Avail: NTIS HC A04/MF A01

Preliminary results from the study of the spin dependence of p vector p vector total cross sections (E-504) were presented and the cross sections and asymmetries of the reaction pp yields ppi(+)n at 500 and 650 MeV were studied. Experiments were conducted to measure: (1) the analyzing power in the p vector p yields d pi(+) reaction for 725 = or < E/sub p/1000 MeV, (Saclay), and (2) T(20) in d vector p elastic scattering near 180 deg for 300 = or < = or < 2300 MeV (Saclay); (3) iT11 in pi-d vector elastic scattering for 219 = or < E/sub pi/= or < 294 (SIN); (4) high precision relative cross sections for elastic proton-proton scattering for 500 = or < E/sub p/= or < 600 MeV (SIN); and (5) A/sub xz/ in the reaction p vector p vector yields pi(+) d for 529 = or < E/sub p/= or < 582 MeV (SIN). New, exciting results using the cloudy bag model with gluonic excitations were obtained for the pionic couplings to nucleon and delta channels of nucleon resonances and on pi-N spectroscopy in the intermediate energy region (approximately 1 to 2 Gev). DOE

N83-34729# Brookhaven National Lab., Upton, N. Y.
COMPARISON OF HIGH-P SUB T PARTICLE PRODUCTION IN PP AND P ANTI P INTERACTIONS AT THE CERN ISR
T. Akesson, M. G. Albrow, S. Almehed, O. Benary, H. Boeggild, O. Botner, H. Brody, V. Burkert, A. DiCiaccio, D. Cockerill et al 1982 14 p refs Presented at the 12th Intern. Symp. on Multiparticle Dyn., Volendam, 1982 Prepared in cooperation with CERN, Geneva, Copenhagen Univ., Lund Univ., Sweden, Pennsylvania Univ., Philadelphia, Science Research Council, Chilton, England, and Tel-Aviv Univ.
(Contract DE-AC02-76CH-00016)
(DE83-002325; BNL-31956) Avail: NTIS HC A02/MF A01

The production of neutral and charged hadrons with transverse momenta were measured in the range 2 GeV/c to 6 GeV/c at Vs = 63 GeV. Data have been obtained under identical experimental conditions in pp and p anti p collisions. The comparison of the inclusive spectra shows no statistically significant difference over the p/sub T/ range studied. DOE

N83-34730# Lund Univ. (Sweden). The Axial Field Spectrometer Collaboration.
A STUDY OF CHARGED PARTICLES ASSOCIATED WITH HIGH-PT PHOTONS AND PIONS
T. Akesson, M. G. Albrow, S. Almehed, E. Anassontzis, R. Batley, O. Benary, H. Boeggild, O. Botner, H. Brody, V. Burkert et al Jul. 1982 20 p refs Presented at the 21st Intern. Conf. on High Energy Phys., Paris, 29 Jul. 1982
(Contract DE-AC02-76CH-00016)
(DE83-002211; BNL-31949; CONF-820718-14) Avail: NTIS HC A02/MF A01

The distributions of charged particles produced in association with high p/sub T/ prompt photons and neutral pions in pp collisions at square root s = 63 GeV and theta = 90 deg in the center of mass are reported. Photons are relatively unaccompanied by other particles at small angles with respect to the photon, and thereby extract a measurement of the fraction of prompt photons due to bremsstrahlung production. The relative density of positive to negative particles in the system recoiling from the photon was measured and compared with QCD motivated calculations. DOE

N83-34731# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.
PROPERTIES OF NUCLEI AT HIGH SPINS
F. S. Stephens Oct. 1982 23 p refs Presented at the Nordic Meeting on Nucl. Phys., Fuglso, Denmark, 16 Aug. 1982
(Contract DE-AC03-76SF-00098)
(DE83-003554; LBL-15070; CONF-820896-2) Avail: NTIS HC A02/MF A01

Nuclei generate high spins by two methods, alignment of single particle angular momentum and collective rotation. The competition of these two modes is discussed for the highest spins 40 < I or < 65 h bar. Evidence is presented that alignment of the h/sub 9/2/ and i/sub 13/2/ proton orbitals from the next higher major shell produces large effects at high spins inrotational nuclei in the A = 160-166 region. It is suggested that such major shell effects produce the still larger irregularities known to occur in the lighter nuclei of this region. DOE

N83-34732# Argonne National Lab., Ill.
A NATIONAL CW GeV ELECTRON MICROTRON LABORATORY
Dec. 1982 316 p refs
(Contract W-31-109-eng-38)
(DE82-004895; ANL-82-83) Avail: NTIS HC A14/MF A01

Argonne National Laboratory proposes to build a CW GeV electron microtron (GEM) laboratory as a national user facility. The microtron accelerator was chosen as technology to generate the electron beams required for the research because of the advantages of superior beam quality, low capital and operating costs and capability of furnishing beams of several energies and intensities simultaneously. A complete technical description of the conceptual design for a six-sided CW microtron (hexatron) is presented. The hexatron and three experimental areas will be housed in a well-shielded complex of existing buildings that provide all utilities and services required for an advanced accelerator and an active research program at a significant cost savings. Beam lines were designed to accommodate the transport polarized beams to each area. DOE

N83-34733# Argonne National Lab., Ill. Chemistry Div.
OUTER-SHELL EXCITATION MECHANISMS AND STATIC-MODE LASER-FLUORESCENCE SPECTROSCOPY OF SPUTTERED ATOMS
D. M. Gruen, M. J. Pellin, C. E. Young, M. H. Mendelsohn, and A. B. DeWald (Georgia Inst. of Tech., Atlanta) 1982 59 p refs Presented at the 4th Intern. Workshop on Inelastic Ion-Surface Collisions, Middlefart, Denmark, 21-24 Sep. 1982
(Contract W-31-109-eng-38)
(DE83-007657; CONF-8209101-2) Avail: NTIS HC A04/MF A01

A review of the literature on atoms sputtered in electronically excited states is given together with a discussion of various mechanisms that have been proposed to account for the observations. The major observational features that have emerged from the older studies may be summarized as follows: (1) the kinetic energies of neutral atoms in highly excited electronic states are

1-2 orders of magnitude greater than E/sub b/, the surface binding energy; (2) relative yields show approximately exponential dependence on excitation energy with characteristic temperatures measured in thousands of degrees; (43) absolute yields are lower by 2-3 orders of magnitude than secondary ion yields which themselves are usually very small compared to total sputtering yields. In many cases, excited-state yields increase 1-2 orders of magnitude as a result of surface oxidation, 83 references. DOE

N83-34734# Wisconsin Univ., Madison. Dept. of Chemistry.
UNIMOLECULAR DYNAMICS OF INTERNAL ENERGY SELECTED MOLECULES Technical Progress Report
1983 11 p refs
(Contract DE-AC02-80ER-10755)
(DE83-011372; DOE/ER-10755/2) Avail: NTIS HC A02/MF A01

Unimolecular reaction dynamics using direct excitation of overtone vibrations in combination with time resolved spectroscopic product detection provide detailed data on unimolecular decomposition rates and energy disposal into the fragments of selectivity excited molecules were studied. The reaction rate of tetramethyldioxetane at several energies using chemiluminescence detection was measured and a pulsed molecular beam apparatus for extending these measurements to cold molecules was constructed. Laser induced fluorescence detection to measure the unimolecular decay rate in selectivity excited t-butylhydrperoxide and to determine the product quantum states populated in the decomposition of hydrogen peroxide and its partially deuterated analogue are used. DOE

N83-34735# Stanford Univ., Calif. Dept. of Chemistry.
INTERNAL ENERGY DISTRIBUTION OF THE PARENT MOLECULE AND ITS PHOTOFRAGMENTS FOLLOWING IR MULTIPHOTON ABSORPTION Final Scientific Report, 1 Apr. 1981 - 30 Sep. 1982
R. N. Zare 1982 10 p
(Contract DE-AT03-80ER-10606)
(DE83-010997; DOE/ER-10606/T1) Avail: NTIS HC A02/MF A01

The internal energy distributions of the C2 and CN fragments formed during the infrared multiphoton dissociation (IRMPD) of vinyl cyanide (CH2 = CHCN) was observed using the technique of laser induced fluorescence. The experiments were performed using either a molecular beam or low pressure flowing gas of the vinyl cyanide parent molecule. By varying the time delay between the CO2 laser pulse and dye laser probe, the dependence of both the C2 and CN fragment energy on the effective laser intensity was investigated. A plasma shutter was used to remove the less intense tail of the CO2 laser pulse without otherwise modifying the laser output. It is found that variations in the pulse intensity distribution control the rotational distribution of CN fragments formed in the photolysis of vinyl cyanide. DOE

N83-34736# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
INELASTIC CROSS SECTIONS FOR ELECTRON INTERACTIONS IN LIQUID WATER
R. N. Hamm, R. H. Ritchie, J. E. Turner, and H. A. Wright 1982 5 p refs Presented at the Workshop on the Interface Between Radiation Phys. and Radiation Chem., Argonne, Ill., 9 Sep. 1982
(Contract W-7405-eng-26)
(DE83-009773; CONF-820998-4) Avail: NTIS HC A02/MF A01

The task was to develop a set of cross sections for electron inelastic processes in liquid water suitable for use in a Monte Carlo transport calculation. Results are plotted as inverse mean free paths vs electron energy. DOE

N83-34737# Rockefeller Univ., New York.
DIFFRACTION DISSOCIATION AND THE DIRECT HADRONIC INTERACTION OF THE PHOTON
K. Goulianos 1983 13 p refs
(Contract DE-AC02-81ER-40033)
(DE83-008891; DOE/ER-40033/36) Avail: NTIS HC A02/MF A01

A measurement of the inclusive diffraction dissociation cross section of approximately 100 GeV photons on hydrogen is discussed. The finite mass sum rule is tested. Comparing with pion dissociation data, factorization is tested. Results are interpreted as providing a measurement of the direct, non-vector meson dominance hadronic interaction of the photon. DOE

N83-34738# Argonne National Lab., Ill.
ION-SOURCE DEVELOPMENT AT ARGONNE
P. J. Bilquist and J. L. Yntema 1982 7 p refs Presented at Symp. for Northeastern Accelerator Personnel, Seattle, 6 Oct. 1982
(Contract W-31-109-eng-38)
(DE83-008911; CONF-821066-4) Avail: NTIS HC A02/MF A01

Brief descriptions are given of the ion source test stand, the ANIS source, a copy of the SNIC source, and the Chapman inverted sputter source. Relative performance is discussed, particularly for the inverted sputter source. Beam currents are given for several ion species. DOE

N83-34739# Brookhaven National Lab., Upton, N. Y.
SMALL-ANGLE ELASTIC AND INELASTIC NEUTRON SCATTERING IN Fe SUB 0.7 Al SUB 0.3
K. Motoya (Tokyo Univ.), S. M. Shapiro, and Y. Muraoka (Kyoto Univ.) Aug. 1982 17 p refs Presented at the 6th Yamada Conf. on Neutron Scattering of Condensed Matter, Tokyo, 1 Sep. 1982
(Contract DE-AC02-76CH-00016)
(DE83-000265; BNL-31798; CONF-820935-5) Avail: NTIS HC A02/MF A01

Small angle elastic and high resolution inelastic neutron scattering measuremment were performed on a single crystal of ordered Fe 0.7 Al 0.3. The small angle scattering intensity drops rapidly above T sub c and a peak appears at lower temperatures whose position shifts with Q. Thermal hysteresis effect observed in the small angle scattering below 300K suggests a slow relaxation motion of magnetic clusters in ferromagnetic phase. Around 300K well defined spin-wave scattering is observed which follows an E=DQ to the 2nd power dispersion relation with D = 17 meV sq A. As the temperature is lowered, the spin-wave peaks fade into a quasielastic central component. An unusual property in the lower temperature part of the ferromagnetic phase was also found in the Q dependence of small angle scattering behavior. DOE

N83-34740# Argonne National Lab., Ill.
APPLICATIONS OF ATOMIC AND MOLECULAR DATA TO RADIATION PHYSICS
Mitio Inokuti 1982 8 p refs Presented at the 15th Ann. Radiological Phys. Contractors Meeting, Gettysburg, Pa., 4 May 1982
(Contract W-31-109-eng-38)
(DE83-009566; CONF-820575-7) Avail: NTIS HC A02/MF A01

The general purpose of our work is to provide atomic and molecular collision cross sections useful for radiological physics, dosimetry, and other applications. Studies on the systematics of atomic oscillator-strength spectra and a survey of stopping power data are briefly described. DOE

N83-34741# Argonne National Lab., Ill.
MOLECULAR PHOTOIONIZATION DYNAMICS
J. L. Dehmer 1982 5 p refs Presented at the 15th Ann. Radiological Phys. Contractors Meeting, Gettysburg, Pa., 4 May 1982
(Contract W-31-109-eng-38)
(DE83-009567; CONF-820575-8) Avail: NTIS HC A02/MF A01

A program that seeks to develop both physical insight and quantitative characterization of molecular photoionization processes is discussed. Progress is briefly described, and some publications resulting from the research are listed. DOE

N83-34742# Argonne National Lab., Ill.
THEORETICAL TRIPLY DIFFERENTIAL CROSS SECTION OF ELECTRON-IMPACT IONIZATION OF ATOMS

Keh-Ning Huang 1983 12 p refs Presented at the American Physical Society Meeting, Boulder, Colo., 23 May 1983
(Contract W-31-109-eng-38)
(DE83-009643; CONF-830530-1) Avail: NTIS HC A02/MF A01

The triply differential cross section of electron-impact ionization of atoms is given in a parameterized form, suitable for theoretical computations or for semi-empirical fittings. Application of the present formulation is demonstrated. erits of coplanar measurements are discussed. It is also shown that the coplanar up-down asymmetry of the ejected electron is linear in the scattering angle, or the momentum transfer, of the incident electron for small momentum transfers. DOE

N83-34743# Washington Univ., Seattle. Dept. of Physics.
SEARCH FOR PARITY NON-CONSERVATION IN THE HYDROGEN ATOM Ph.D. Thesis
M. Z. Iqbal 16 Mar. 1983 223 p refs
(Contract DE-AC06-81ER-40048)
(DE83-012903; DOE/ER-40048/53-L3) Avail: NTIS HC A10/MF A01

A search for parity non-conservation was made in the hydrogen atom by looking for a small admixture of the 2P/sub 1/2/ state in the 2S/sub 1/2/ state. Since the predicted effect due to neutral current interaction is exceedingly small an interference technique was used. The two 2S/sub 1/2 m/sub J/ = 1/2) (FEMALE) 2S/sub 1/2/(m/sub J/ = -1/2) parity conserving and parity non-conserving amplitudes were driven in two separate microwave cavities. A cylindrical geometry is chosen for the apparatus for a great reduction of the contributions from spurious amplitudes. The difference in the transition rate, when the relative sign of the two amplitudes are changed, is the PNC signal. The apparatus, control system and the different measurement techniques are discussed. The present results are limited by the systematic errors due to the presence of stray electric fields. The observed asymmetry when expressed in terms of C2/sub p/ was found to be equal to 430 + or - 500. Possible modifications for further improvement and the feasibility of an experiment in zero magnetic field is discussed in the context of future use of a thermal beam. DOE

N83-34744# Paris-Sud Univ., Orsay (France). Lab. de Physique des Gaz et des Plasmas.
ELECTRON ENERGY DISTRIBUTIONS AND EXCITATION RATES IN HIGH FREQUENCY ARGON DISCHARGES
C. M. Ferreira and J. Loureiro (Universidade Tecnica de Lisboa) Jun. 1983 27 p refs Submitted for publication Sponsored by CNRS
(LP-201) Avail: NTIS HC A03/MF A01

The electron energy distribution functions and rate coefficients for excitation and ionization in argon under the action of a uniform high frequency electric field were calculated by numerically solving the homogeneous Boltzmann equation. The treatment is restricted to situations in which the electrons do not lose appreciable energy during a cycle of field oscillation. Analytic calculations in the limiting cases w is much > v sub c and w is much < v sub c where w is the wave angular frequency and v sub c is the electron neutral collision frequency for momentum transfer, are shown to be in very good agreement with the numerical computations. The results are relevant for improving theoretical descriptions of a plasma column sustained by surface microwaves.
Author (ESA)

N83-34828# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
RELAXATION OF VIBRATIONAL DEGREES OF FREEDOM [RELAXATION VON SCHWINGUNGSFREIHEITSGRADEN]
A. Frohn *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 137-149 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N83-34745 Atomic Weapons Research Establishment, Aldermaston (England).
RESULTS OF INTEGRAL EXPERIMENTS ON VERA ASSEMBLIES
W. J. Paterson, W. B. McCormick, and M. H. McTaggart Jun. 1983 25 p refs
(AWRE-O-9/83; ISBN-0-85518149-4; BR88361) Copyright. Avail: Issuing Activity

The VERA reactor was used to study fast power reactor design, and to provide experimental results for small fast assemblies against which calculations can be compared to improve the nuclear cross sections used. Experimental methods and results concerning critical sizes, central reaction rate ratios, and neutron spectrum measurements are outlined. Author (ESA)

N83-34746# Rockwell International Corp., Richland, Wash. Energy Systems Group.
WASTE PACKAGE CONCEPTUAL DESIGNS FOR A REPOSITORY LOCATED IN BASALT
M. J. Smith Sep. 1982 11 p refs Presented at the NWTS Inform. Meeting on Basalt Waste Isolation Project, Las Vegas, Nev. 14-15 Dec. 1982
(Contract DE-AC06-76RL-01030)
(DE83-001750; RHO-BW-SA-254-P; CONF-821205-12) Avail: NTIS HC A02/MF A01

Results are reported of a joint effort to develop conceptual designs for waste packages to be emplaced in a repository located in basalt. Practical reference designs for commercial high-level waste and circular bundles of spent fuel rods from three pressurized water reactor assemblies or seven boiling water reactor assemblies were developed on the basis of cost effectiveness. Each of the designs is based upon clearly defined environmental and regulatory performance factors that were used in developing package design criteria. The package design was utilized in updating the conceptual design of the nuclear waste repository in basalt. A technique for developing performance and design criteria based on the favorable environmental characteristics (low-Eh, moderate-pH, low-ionic-strength groundwater) of the basalts beneath the Hanford Site are also discussed. DOE

N83-34747# Rockwell International Corp., Richland, Wash. Energy Systems Group.
TESTING OF CANDIDATE WASTE-PACKAGE BACKFILL AND CANISTER MATERIALS FOR BASALT
M. I. Wood, W. J. Anderson, and G. D. Aden Sep. 1982 9 p Presented at the NWTS Inform. Meeting on Basalt Waste Isolation Project, Las Vegas, Nev., 14-15 Dec. 1982
(Contract DE-AC06-76RL-01030)
(DE83-001487; RHO-BW-SA-255-P; CONF-821205-23) Avail: NTIS HC A02/MF A01

The Basalt Waste Isolation Project (BWIP) is developing a multiple-barrier waste package to contain high-level nuclear waste as part of an overall system (e.g., waste package, repository sealing system, and host rock) designed to isolate the waste in a repository located in basalt beneath the Hanford Site, Richland, Washington. The three basic components of the waste package are the waste form, the canister, and the backfill. An extensive testing program is under way to determine the chemical, physical, and mechanical properties of potential canister and backfill materials. The data derived from this testing program will be used to recommend those materials that most adequately perform the functions assigned to the canister and backfill. DOE

N83-34748# Rockwell International Corp., Richland, Wash. Energy Systems Group.

SUMMARY OF NEAR-SURFACE TEST FACILITY RESULTS AND THEIR APPLICATION TO REPOSITORY DESIGN

E. C. Gregory, M. L. Cramer, W. M. McCabe, and K. Kim Sep. 1982 16 p refs Presented at the NWTS Inform. Meeting on Basalt Waste Isolation Proj., Las Vegas, Nev., 14-15 Dec. 1982

(Contract DE-AC06-77RL-01030)

(DE83-001755; RHO-BW-SA-256-P; CONF-821205-20) Avail: NTIS HC A02/MF A01

Results from ongoing and newly initiated tests at the Near-Surface Test Facility contributed substantially to the store of knowledge of rock mass characterization of basalt at a variety of temperatures. Enhancements in monitoring instrumentation and testing techniques were achieved. These developments assisted in the determination of site suitability of Hanford basalt formations and contributed to refinement of predictive numerical models for use in repository design. Most recently, the testing program resulted in the following: an improved method of determining thermal expansion effects on the borehole deformation gage; an improved method of monitoring the stress relief process during the doorstopper overcoring process; and the development of a high-resolution optical device for monitoring rock mass deformation in several directions simultaneously. DOE

N83-34749# Rockwell International Corp., Richland, Wash. Energy Systems Group.

NUCLEAR-WASTE REPOSITORY IN BASALT: SEAL DEVELOPMENT STUDIES

W. J. Anderson, L. G. Clayton, A. E. Cottam, G. K. Jacobs, W. W. Schulz, and R. A. Watrous Sep. 1982 9 p ref Presented at the NWTS Inform. Meeting on Basalt Waste Isolation Proj., Las Vegas, Nev., 14-15 Dec. 1982

(Contract DE-AC06-77RL-01030)

(DE83-001490; RHO-BW-SA-258-P; CONF-821205-16) Avail: NTIS HC A02/MF A01

Current efforts are concentrated on establishing performance requirements and design criteria for a seal system. To accomplish this objective, the repository seal system is considered as one component of the multiple barriers concept of waste isolation. A simple calculational method to predict steady state flow rates through a system of shaft seals and backfill zones as a function of plug dimensions, material permeability, and predicted hydraulic gradient was developed. A Tektronix desk top computer has been programmed to assist in executing the calculations. A preliminary analysis of computer-produced data indicates disturbed rock zone permeability dominates calculated flow rates and travel times and, therefore as further studies proceed, greater emphasis will be given to the disturbed rock zone characterization. The goal is to develop a model that is supported and verified by design development and laboratory, field, and in situ materials testing. DOE

N83-34750# Rockwell International Corp., Richland, Wash. Energy Systems Group.

CONCEPTUAL DESIGN OF THE NUCLEAR-WASTE REPOSITORY IN BASALT

D. A. Turner Sep. 1982 11 p Presented at the NWTS Inform. Meeting on Basalt Waste Isolation Proj., Las Vegas, Nev., 14-15 Dec. 1982

(Contract DE-AC06-76RL-01030)

(DE83-001486; RHO-BW-SA-259-P; CONF-821205-24) Avail: NTIS HC A02/MF A01

The conceptual Nuclear Waste Repository in Basalt, sized to dispose of spent fuel and commercial high-level waste equivalent to approximately 52,200 tons of heavy metal, cooled for 10 y, and 32,000 drums of low-level transuranic waste is discussed. Retrieval capability shall be maintained for up to 50 y. The reference repository location is in the Hanford Site. The surface and subsurface facilities will occupy 40.5 ha (200 acres) and 588 ha (1455 acres), respectively. The design of the underground spaces is described. DOE

N83-34751# Pacific Northwest Lab., Richland, Wash.

IN SITU VITRIFICATION: APPLICATION ANALYSIS FOR STABILIZATION TRANSURANIC WASTE

K. H. Oma, R. K. Farnsworth, and J. M. Rusin Sep. 1982 120 p refs

(Contract DE-AC06-76RL-01830)

(DE83-002889; PNL-4442) Avail: NTIS HC A06/MF A01

The in situ vitrification process builds upon the electric melter technology previously developed for high-level waste immobilization. In situ vitrification converts buried wastes and contaminated soil to an extremely durable glass and crystalline waste form by melting the materials, in place, using joule heating. Once the waste materials have been solidified, the high integrity waste form should not cause future ground subsidence. Environmental transport of the waste due to water or wind erosion, and plant or animal intrusion, is minimized. Environmental studies are currently being conducted to determine whether additional stabilization is required for certain in-ground transuranic waste sites. An applications analysis was performed to identify several in situ vitrification process limitations which may exist at transuranic waste sites. Based on the process limit analysis, in situ vitrification is well suited for solidification of most in-ground transuranic wastes. DOE

N83-34752# Pennsylvania State Univ., University Park. Materials Research Lab.

REACTIONS OF A PROTOTYPE NUCLEAR-WASTE CERAMIC WITH A HOT MAGNESIUM-RICH BRINE

Sridhar Komarneni, Barry E. Scheetz, W. Phelps Freeborn, Gregory J. McCarthy, and William B. White Oct. 1982 66 p refs

(Contract DE-AC06-76RL-01830)

(DE83-002762; ONWI-307) Avail: NTIS HC A04/MF A01

Prototype ceramic nuclear waste forms were experimentally reacted with a high calcium and magnesium brine under hydrothermal conditions. The said reaction products and fluid were analyzed at the end of the experiment. Alteration of the waste forms was observed and the reaction products identified. Uptake of cesium, rubidium, strontium, barium, lanthanum and neodymium into the brine was measured with a strong temperature dependence, i.e., increased concentrations with increased temperature. The concentrations of the six elements also increased with time, and imply that dissolution of the ceramic is controlled by diffusion and/or crystalline dissolution mechanism. DOE

N83-34753# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.

BETATRONS WITH KILOAMPERE BEAMS

Jack M. Peterson Nov. 1982 5 p refs Presented at 7th Conf. on the Appl. of Accelerators in Res. and Ind., Denton, Tex., 8 Nov. 1982

(Contract DE-AC03-76SF-00098)

(DE83-005857; LBL-15206; CONF-82113-34) Avail: NTIS HC A02/MF A01

Although the magnetic induction method of acceleration used in the betatron is inherently capable of accelerating intense particle beams to high energy, many beam instability questions arise when beams in the kiloampere range are considered. The intense electromagnetic fields produced by the beam, and by the image currents and charges induced in the surrounding walls, can produce very disruptive effects. Several unstable modes of collective oscillation are possible; the suppression of any one of them usually involves energy spread for Landau damping and careful design of the electrical character of the vacuum chamber. The various design criteria are often mutually incompatibie. Space charge detuning is severe unless large beam apertures and high energy injection are used. Image compensation was invented for reducing the net image forces; it serves also to decrease the longitudinal beam impedance and thus helps alleviate the longitudinal instability as well. DOE

N83-34754# Sandia Labs., Albuquerque, N. Mex. Seabed Programs Div.

SUBSEABED DISPOSAL: SYSTEMATIC APPLICATION OF THE SITE-QUALIFICATION PLAN

L. E. Shephard, J. E. Damuth (Lamont-Doherty Geological Observatory), D. B. Hayes (Lamont-Doherty Geological Observatory), G. R. Heath (Oregon State Univ., Corvallis), E. P. Laine (Rhode

Island Univ., Narragansett), M. Leinen (Rhode Island Univ., Narragansett), and B. E. Tucholke (Woods Hole Oceanographic Inst.) 1982 15 p refs Presented at the Marine Technology Society and Geological Society of America Conf. on Oceans, Washington, D.C., 20 Sep. 1982
(Contract DE-AC04-76DP-00789)
(DE82-018750; SAND-82-1379C; CONF-820926-1) Avail: NTIS HC A02/MF A01

Two criteria, geologic stability and barrier effectiveness, form the basis of the Subseabed Disposal Program's site qualification plan to evauate the ocean basins and identify those regions having characteristics most favorable for containment of radioactive waste. Stability criteria are used to define those regions least likely to be disturbed by tectonic forces or oceanographic changes during the lifetime of a waste repository. Barrier criteria define those lithologies most likely to form an effective barrier to the release of radionuclides. Two north Pacific regions and three north Atlantic regions were selected for further investigation based on the site qualification plan. The PAC I region, centered on the Shatsky Rise in the northwest Pacific, was subdivided into areas and locations on the basis of an exhaustive review of data. DOE

N83-34755# Oak Ridge National Lab., Tenn.
EQUILIBRIUM AND STABILITY STUDIES FOR HIGH-BETA PLASMAS IN TORSATRON/HELIOTRON DEVICES
B. A. Carreras, L. A. Charlton, W. A. Cooper, L. Garcia, J. H. Harris, T. C. Hender, H. R. Hicks, J. A. Holmes, V. E. Lynch, and B. F. Masden 1983 13 p refs Presented at the US/Japan 3-D MHD Workshop, Nagoya, Japan, 8 Mar. 1983 Prepared in cooperation with Union Carbide Corp., Oak Ridge, Tenn.
(Contract W-7405-eng-26)
(DE83-009857; CONF-830342-1) Avail: NTIS HC A02/MF A01

The equilibrium and stability properties of high beta plasmas in torsatron/heliotron devices were investigated. Three numerical approaches were used to study plasma equilibria for a range of coil configurations. The method of averaging permits fast equilibrium and stability calculations. Two fully 3-D codes, namely the Chodura-Schluter code, and the NEAR code recently developed at ORNL, are used to explore selected regions of parameter space. The resulting equilibria calculated with different methods are in good agreement. This validates the average method approach and enhances its usefulness. Results are presented for configurations with different aspect ratios and number of field periods. The role of the vertical field also was studied in detail. The main conclusions is that for moderate aspect ratios (A/sub p/ equal to or < 8), the self-stabilizing effect of the magnetic axis shift is large enough to open a direct path to the second stability regime. DOE

N83-34756# Electricite de France, Chatou. Dept. Optimisation et Automatisation des Processus.
VALIDATION OF A NUMERICAL MODEL OF A LIGHT WATER REACTOR PRESSURIZER [VALIDATION DU MODELE NUMERIQUE DE PRESSURISEUR DE TRANCHE NUCLEAIRE A EAU LEGERE]
P. Siarry May 1982 57 p refs In FRENCH
(HP-40/82/353) Avail: NTIS HC A04/MF A01

The global qualitative behavior of an LWR pressurizer numerical model was validated by comparing predictions with measurements on a reactor. Thermodynamic calculations were validated by comparing results with those of a similar code. Simulation of pressure and level regulation was validated by comparison with a working reactor. Overall model performance is strongly dependent on regulation parameter precision. Author (ESA)

N83-34757# Technical Research Centre of Finland, Espoo. Electrical Engineering Lab.
ASSESSMENT OF CONTROL ROOMS OF NUCLEAR POWER PLANTS
Leena Norros, Jukka Ranta, and Bjoern Wahlstroem May 1983 30 p refs Sponsored by Finnish Ministry of Trade and Industry
(VTT-184; ISBN-951-38-1763-6; ISSN-0358-5077) Avail: NTIS HC A03/MF A01; Technical Research Centre of Finland, Espoo FIM 25

The NUREG 0700 recommendations were assessed for implementation in the control rooms of Finnish nuclear power plants. Direct conclusions drawn from the American situation are misleading, because of differences in, for example, procurement of instruments or personnel training. If the review is limited to control room details, the NRC program (checklist) is successful. It can also be used during planning to observe small discrepancies.Author (ESA)

N83-34758# Institute of Oceanographic Sciences, Wormley (England).
RESEARCH IN CONNEXION WITH THE POSSIBLE DISPOSAL OF HIGH LEVEL RADIOACTIVE WASTE ON OR BENEATH THE OCEAN FLOOR Status Report, Mar. 1982
Mar. 1983 67 p refs
(Contracts DGR-481/179; EEC-257-81-7-WAS-UK)
(IOS-153; DOE/RW-82/089) Avail: NTIS HC A04/MF A01

Selection and evaluation of areas and sites for the disposal of high level radioactive waste; properties of ocean sediments in relation to the disposal of radioactive waste; biological transfer of materials between seabed and surface; the benthic boundary layer in relation to the disposal of radioactive waste; and dispersion in the Northeast Atlantic are discussed. On the seabed and below the seabed disposal are considered. Author (ESA)

74 OPTICS

Includes light phenomena.

N83-34759*# National Aeronautics and Space Administration, Washington, D. C.
THE ATMOSPHERE AS A LENS
G. Mazurov, O. Bazarskiy, and V. Zhukov May 1983 5 p Transl. into ENGLISH from Aviats. i Kosmonavtika (USSR), no. 1, 1983 p 43 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-77226; NAS 1.15:77226) Avail: NTIS HC A02/MF A01 CSCL 20F

The advent of manned satellites has made it possible for man to observe Earth from great distances. Many new phenomena have been discovered in the atmosphere. These are evidently caused by reflection, scattering or refraction of light on crystals and drops of water. It is possible to see small objects on the surface of Earth because of these anomalies. Author

N83-34760# Defence Research Establishment Valcartier (Quebec).
IMAGING RECEIVER FOR TARGET REFERENCING OF ADAPTIVE OPTICAL SYSTEMS PERFORMANCE AND COMPARISON WITH PREDICTIONS
L. R. Bissonnette and N. Blais (Sherbrooke Univ.) Mar. 1983 35 p refs
(AD-A126616; DREV-4292/83) Avail: NTIS HC A03/MF A01 CSCL 17/8

The imaging method for target referencing of adaptive optics systems in the presence of extended targets in turbulence is compared with the conventional method which assumes an unresolved glint target. The tests were performed with a tilt-compensation system. There is a degradation due to the imaging process, but the technique still gives satisfactory results well into the scintillation saturation region. The gain measurements agree well with the predictions based on the propagation model developed at Defence Research Establishment Valcartier (DREV). Author

N83-34761# Harry Diamond Labs., Adelphi, Md.
A FIBER-OPTIC LINK FOR USE WITH MICROWAVE FIELD SENSORS
James C. Blackburn and Peter Li Mar. 1983 19 p refs
(DA Proj. 1L1-62120-AH-25)
(AD-A126550; HDL-TM-83-2) Avail: NTIS HC A02/MF A01 CSCL 14/2

Two types of compact fiber optic links designed to provide

dielectric isolation and noise immunity to the interconnection of subminiature microwave field sensor probes and remotely located test equipment are described. The system measures the microwve signal levels leaking into partially shielded electronic packages. The fast rise link (rise time < 3ns) is for use where the microwave irradiation source produces radarlike short pulses. The high sensitivity link (input noise level < 3 micron V) is for use with laboratory 1 KHz modulated microwave sources. The transmitters are the size of a gum eraser, 1 1/4 x 1 1/4 x 2 3/8 in. The 15 V dc power for the transmitters is obtained either from the system under test or a small NiCd battery. Author

N83-34762# Naval Postgraduate School, Monterey, Calif. Dept. of Physics.
MEASUREMENTS OF DIRECT PATH AND FOLDED PATH OPTICAL SCINTILLATION M.S. Thesis
Frederick Hobbs Parker and Bradford Arthur Speer Dec. 1982 183 p refs
(AD-A126627) Avail: NTIS HC A09/MF A01 CSCL 20/6

A theoretical prediction by Dr. Avihu Ze'evi of the correlation between direct path and folded path optical scintillation was developed and published at the Naval Post-graduate School in March 1982. Simultaneously, a method for measuring the scintillation of two laser beams propagating along direct and folded paths was devised and used to record preliminary findings supporting the theoretical work. This system was improved upon to permit a complete experimental verifiction of the theory to be attempted outside the laboratory. The experimental results do not support Dr. Ze'evi's theory; however, changing turbulance conditions while measuring the scintillation strength may be the cause. GRA

N83-34763# Stanford Univ., Calif. Dept. of Computer Science.
DEPTH FROM EDGE AND INTENSITY BASED STEREO M.S. Thesis, Aug. 1978 - Sep. 1981
Henry Harlyn Baker Sep. 1982 98 p refs
(Contract MDA903-82-C-0102; ARPA Order 2494)
(AD-A126745; SU-STAN-CS-82-930; SU-AIM-347) Avail: NTIS HC A05/MF A01 CSCL 20/6

A system for obtaining depth maps from a stereo pair of images is described. Its analysis is based on techniques for subsequent intensity correspondence. The process functions on a line-by-line basis, and produces a full depth map for the viewed scene. The analysis of two example scenes is presented. Author

N83-34764# Perkin-Elmer Corp., Danbury, Conn.
FEASIBILITY STUDY REPORT FOR THE EEP ADAPTATION CONCEPT TO A B&L 500 STEREOMICROSCOPE Final Report, Mar. - Nov. 1982
Joseph Dunn and John Sivinski St. Louis AFS, Mo. Defense Mapping Agency Aerospace Center Jan. 1983 23 p
(Contract DMA700-81-C-0062)
(AD-A126662; DMAAC-ST-TR-82-12; ER-540) Avail: NTIS HC A02/MF A01 CSCL 20/6

A breadboard experiment was performed which utilized a Bausch & Lomb Zoom 500 stereomicroscope, fabrications of an Expanded Exit Pupil (EEP) device and a High Intensity Light Source. Experimental results showed it was possible to achieve a stereo image on the EEP screen that permits stereo viewing without the aid of supportive polarized glasses or anaglyphic differentiation. A project stereo image was achieved throughout the Zoom 500 magnification range, however a significant reduction in the resolution of of photographic inputs was measured. Brightness measurement showed that in all magnification used, a brightness exceeding 130-footlamberts was achieved. Unaided stereo viewing was possible within limits of head movement of + or - 6 inches on axis and + or - 1.5 inches off axis. Author

N83-34765# General Electric Co., Lanham, Md. Space Systems Div.
INTERACTIVE IMAGE ANALYSIS SYSTEM DESIGN
Howard L. Heydt, Richard A. OConnell, and Thomas F. Wescott Dec. 1982 60 p
(Contract DAAK70-79-C-0153)
(AD-A126829; ETL-0312) Avail: NTIS HC A04/MF A01 CSCL 20/6

Requirements analysis and a system design for an interactive image analysis system capable of performing the Terrain Data Extraction process are presented. The system is based on a VAX 11/750 minicomputer with a DeAnza IP8500 image display terminal. Commercially available, state-of-the-art hardware is defined yielding a cost effective reliable system fully capable of performing the terrain data extraction process. Author

N83-34766# Maryland Univ., College Park. Computer Vision Lab.
IMAGE SEQUENCE ENHANCEMENTS BASED ON THE NORMAL COMPONENT OF IMAGE MOTION
Larry S. Davis, Hu-chen Hie, and Azriel Rosenfeld Jul. 1982 14 p refs
(Contract DAAG53-76-C-0138; DARPA Order 3206)
(AD-A128652; TR-1189) Avail: NTIS HC A02/MF A01 CSCL 12/1

In a recent paper, Huang and Hsu describe an enhancement algorithm for time-varying images. This algorithm achieves the type of enhancement that one would obtain from averaging multiple images of a static scene by using motion vectors computed from the sequence to establish the correspondence between pixels in successive frames. The purpose of this note is to demonstrate how and why it is often sufficient to consider only the normal components of the motion vectors, i.e., the component in the gradient direction, to compute such enhancements. There is a computational advantage to using only the normal component, since it is directly measurable from the image sequence by combining the space and time derivatives of image intensity, while computing the actual motion vectors ordinarily requires some spatial integration of the normal components or the application of a local correlation procedure. Furthermore, in order to compute the motion vectors one must make some assumption about the local image motion (for example, that the image motion is a two-dimensional translation); when this assumption is incorrect, the computed motion vectors will be in error. GRA

N83-34767# Pacific Northwest Lab., Richland, Wash.
COLOR ANAGLYPH STEREO SCATTERPLOTS: CONSTRUCTION DETAILS
Daniel B. Carr and Richard J. Littlefield Mar. 1983 6 p refs Presented at the 15th Symp. on the Interface of Computer Sci. and Statistics, Houston, Tex., 16 Mar. 1983
(Contract DE-AC06-76RL-01830)
(DE83-009364; PNL-SA-111023; CONF-830324-1) Avail: NTIS HC A02/MF A01

For those that can see stereo, stereo scatterplots provide a powerful method of displaying data that has three dimensional structure. While not the best quality stereo presentation method, color anaglyph stereo is easily produced on raster color devices. This simplicity makes color anaglyph stereo a useful tool for exploratory interactive data analysis. Attention to several details can enhance anaglyph scatterplots. Issues of perspective projection ambiguity, pixel-rounding noise, crosstalk between images, and the use of additional depth cues including overplotting, and shifts in point size, intensity, and hue are addressed. DOE

N83-34768# Fiat Research Center, Orbassano (Italy).
FLUID PHYSICS MODULE: IMPROVED OPTICAL DESIGN FEASIBILITY STUDY Final Report
E. Ferrati, C. Dadda, A. Mariani, R. Cerrato, R. Librino, and G. Antonucci Paris ESA Sep. 1982 364 p refs Partly in ENGLISH, FRENCH and ITALIAN
(Contract ESTEC-4496/80/NL-HP(SC))
(ESA-CR(P)-1743) Avail: NTIS HC A16/MF A01

An optical bench was designed and the optical system performances were experimentally evaluated. Different configurations of the optical bench are analyzed and a detailed description of the chosen solution is presented. This is an L shape spatial structure composed of 8 rails 500 mm long which allow vertical or horizontal rotation axis of the rotating table in the test chamber.

Tests were performed in the meridian plane and in the background plane using different optical configurations and different light sources. The possibility of operating with Xenon lamps in pulse mode is demonstrated. Optical system performance is improved by the correction of spherical and chromatic aberrations of the condensing system and by optimizing dimensions and position of optical elements. Performance data of the initial and improved system with halogen or Xenon lamp solutions are compared.
Author (ESA)

N83-34769# Thomson-CSF, Orsay (France). Lab. Central de Recherches.
STUDY OF AN ANALOG TO DIGITAL CONVERTER IN INTEGRATED OPTICS Final Report
Y. Bourbin, A. Enard, S. Vatoux, and M. Papuchon Paris ESA Mar. 1983 109 p refs In FRENCH
(Contract ESTEC-4390/80/NL-HP(SC))
(LCR-83-8; ESA-CR(P)-1744) Avail: NTIS HC A06/MF A01

An analog to digital converter implemented in integrated optics is presented. The amplitude modulator is obtained using an interferometer of the Mach Zender type. The monomode inlet channel divides into two monomode paths which constitute the arms of the interferometer. Electrodes are used to control the phase in the TiLiNbO3 guides. The Pockels effect is used to modify the refraction index to control the wave phase. As the phase shift is proportional to the electrode length, a number of devices with electrode lengths with ratio two are used. A 6 bit converter with a capacity of 1 Mbit/s was implemented. The conversion is independent of light polarization. Author (ESA)

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N83-34770 Rochester Univ., N. Y.
NONLINEAR EVOLUTION OF AN ELECTRON PLASMA WAVE AND NONLINEAR SATURATION OF THE TWO PLASMONS INSTABILITY IN AN INHOMOGENEOUS PLASMA Ph.D Thesis
Thierry Marie Dewandre 1982 174 p
Avail: Univ. Microfilms Order No. DA8302131

The time behavior of a single damped mode (or weakly unstable mode near saturation) is analyzed. Analytic expressions are obtained for the time dependent mode damping and frequency shift. These expressions are equivalent to those of O'Neil and to those of Morales and O'Neil, but are in a much simpler form since they contain no sums. The nonlinear saturation of the two plasmons instability in an inhomogeneous plasma is analyzed. The electrons are described by a fluid model and the ions are assumed immobile. From the linear theory, a threshold is obtained resulting from the balance between the driving force - the laser light - and the density gradient and electron temperature which limit the width of the region of interaction for the decay process. Bringing the system slightly above threshold by decreasing the electron temperature, one calculates the unstable modes at second order. A nonsecularity condition is then obtained at third order, which determines the saturation amplitude of the two decay modes. The pump depletion effect is shown to dominate the effects of adiabatic electron heating and of profile modification, in producing the saturation. Saturation occurs at too low an amplitude for kinetic effects to be significant. Dissert. Abstr.

N83-34771 California Univ., Berkeley.
AXIAL FLOW OF A COLLISIONAL PLASMA THROUGH MULTIPLE MAGNETIC MIRRORS Ph.D. Thesis
Ronald Victor Bravenec 1982 178 p
Avail: Univ. Microfilms Order No. DA8300441

The flow of a collisional plasma along a magnetic field is studied, with emphasis on flow through multiple magnetic mirrors. A steady state analysis of viscous flow through a multiple mirror device is performed to understand the transition from sonic flow to diffusion with increasing values of lambda/m(lambda is the ion-ion mean free path and /m is the mirror scale length). Numerical and experimental studies of transient plasma injection into a multiple mirror device are presented in order to understand the process by which a collisional plasma is trapped. Steady state solutions for an isothermal plasma are first given for a uniform field and a single mirror. These results are then used to study flow through a multiple mirror device, for which it is shown that the isothermal assumption is valid because of ion viscous heating. Numerically determined density profiles and confinement times are compared to approximate analytical solutions, an empirical expression for the confinement line is obtained which exhibits additively the contribution of viscosity to the ideal fluid confinement time. Dissert. Abstr.

N83-34772 Louisiana State Univ., Baton Rouge.
EXPERIMENTAL STUDY OF THE FLUID DRAG ON A TORUS AT LOW REYNOLDS NUMBER Ph.D. Thesis
Dharmaratne Amarakoon 1982 107 p
Avail: Univ. Microfilms Order No. DA8229486

Measurements are presented for the drag on a torus moving along its axis of rotational symmetry at low Reynolds number. If D is the outside diameter of the torus, and d is the thickness in the axial direction, then the measurements cover the range s sub o = 1 (the closed torus) to s sub o = 135, where s sub o is identical to = (D/d) - 1. The effect of a coaxial cylindrical boundary (diameter H) is taken into account by an empirical correlation. The values of drag obtained by extrapolating to a fluid of infinite extent are in good agreement with the exact solution obtained by Majumdar and O'Neill. When pi D(s sub o) (1/2) < < H the empirical boundary correlation is consistent with the result of Brenner for small particles. Measurements with outer boundaries of square and circular cross-section indicate that the relative effect of the two boundary shapes on the drag is the same for the torus as that found by Happel and Bart for a sphere. Empirical results are presented for the case in which the torus is strongly influenced by a coaxial cylindrical boundary. The combined inertial and boundary effect for the torus has been related to the combined inertial and boundary effect for a sphere by an empirical equation. Dissert. Abstr.

N83-34773# Nagoya Univ. (Japan). Inst. of Plasma Physics.
BIBLIOGRAPHY ON IONIZATION AND CHARGE TRANSFER PROCESSES IN ION-ION COLLISION
Hiroyuki Tawara Jun. 1983 32 p
(IPPJ-AM-25) Avail: NTIS HC A03/MF A01

The collision process between ions plays a key role in realization of the inertial confinement fusion reactors as well as magnetic confinement reactors. A bibliographic compilation is given on the experimental and theoretical investigations on the charge transfer and ionization processes in ion-ion collisions. L.F.M.

N83-34774# Georgia Inst. of Tech., Atlanta. School of Physics.
THE DRIFT, DIFFUSION AND REACTIONS OF SLOW IONS IN GASES Final Report, 1 Mar. 1980 - 28 Feb. 1983
E. W. McDaniel and I. R. Gatland 30 Mar. 1983 5 p refs
(Contract N00014-80-C-0243; NR Proj. 014-314)
(AD-A126604) Avail: NTIS HC A02/MF A01 CSCL 20/9

Studies relating to ionic transport in gases are described. Measurements of ionic mobilities and diffusion coefficients are discussed. The use of the mobility data to obtain ion-neutral interaction potentials is also addressed. GRA

N83-34775# Northeastern Univ., Boston, Mass. Dept. of Electrical Engineering.
EFFECTS OF NONCONVECTIVE ELECTRIC FIELDS ON MAGNETOSPHERE PLASMA DYNAMICS Final Report, 1 Dec. 1981 - 31 Jan. 1983
M. B. Silevitch 31 Jan. 1983 99 p refs
(Grant AF-AFOSR-3731-78; AF Proj. 2311)
(AD-A128432; AFOSR-83-0379TR) Avail: NTIS HC A05/MF A01 CSCL 20/9

A study of a mechanism which can cause the disruption of a stationary electric potential structure was completed. Results were applied to the parallel electric fields which are associated with auroral arcs. A program of research directed towards analyzing the structure of small scale auroral vortices observed by an Air Force satellite was completed. Two intense auroral events marked by large deflections in the east-west magnetic field component were studied. The events are associated with electric fields whose magnitude can exceed 200 mV/m. Electric field variations give rise to plasma vortex flow patterns similar to these observed in auroral folds and curls. Observed values were consistent with collisionless, single-particle theories. Author (GRA)

N83-34776# Naval Research Lab., Washington, D. C.
STABILIZING EFFECT OF GAS CONDUCTIVITY EVOLUTION ON THE RESISTIVE SAUSAGE MODE OF A PROPAGATING BEAM Interim Report
M. Lampe and G. Joyce 8 Jun. 1983 27 p refs
(ARPA Order 4395)
(AD-A128922; NRL-MR-5080) Avail: NTIS HC A03/MF A01 CSCL 12/1

Previous theoretical work has shown that a highly current neutralized charged particle beam propagating in a pre-ionized plasma channel of fixed conductivity is subject to a resistive sausage instability. The authors show that the instability if stabilized, for the case of beam propagation into initially unionized gas, when the effect of beam-collisional ionization on the gas conductivity is modeled fully self-consistently. Author (GRA)

N83-34777# Lancaster Univ., Bailrigg (England). Dept. of Environmental Sciences.
EISCAT ELECTRON DENSITY STUDIES Final Report, 1 May 1982 - 30 Apr. 1983
S. C. Kirkwood and J. K. Hargreaves 1 May 1983 49 p refs
(Grant AF-AFOSR-0054-83; AF Proj. 2310)
(AD-A130299; AFGL-TR-83-0165) Avail: NTIS HC A03/MF A01 CSCL 09/9

Operational details and first results of a program to study irregular electron density structure in the auroral F-region using the EISCAT incoherent-scatter radar are presented. Large amplitude, localised, electron density enhancements are observed in active, night-time conditions. Two types of large-scale enhancement are seen: one with large amplitudes in the E and lower F-region, with amplitudes decreasing rapidly with further increase in altitude, the other confined to the F-region with largest amplitudes on the topside. Evidence for intermediate scale structuring associated with precipitation, in some instances, and with probable formation by plasma instabilities in others, is also presented.
Author (GRA)

N83-34778# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.
MAGNETIC-COIL OPTIMIZATION FOR QUADRUPOLE-STABILIZED MIRROR SYSTEM
D. A. Dippolito, G. L. Francis, and J. R. Myra Apr. 1983 27 p refs
(Contract DE-AC03-76ET-53057)
(DE83-012362; SAI-254-83-438-LJ; PRI-61) Avail: NTIS HC A03/MF A01

A numerical technique is presented to optimize the design of quadrupole magnetic coil systems, such as presently used in tandem mirror fusion experiments. The optimization is carried out on plasma physic properties which depend on the magnetic field geometry. The coils are treated as filaments of infinitesimal thickness and the magnetic field is computed in the paraxial limit. Constraints on the coil shape and on the magnetic geometry can be incorporated into the method. It is demonstrated that coil solutions can be found which match given paraxial field profiles or which directly minimize a scalar functional of these profiles. A filamentary coil design for a nearly omnigenous anchor is obtained in the application of the latter technique. GRA

N83-34779# California Univ., Livermore. Lawrence Livermore Lab.
RADIAL SPACE POTENTIAL MEASUREMENTS IN THE CENTRAL CELL OF THE TANDEM MIRROR EXPERIMENT WITH A HEAVY ION-BEAM PROBE
S. A. Hallock 11 Apr. 1983 275 p refs
(Contract W-7405-eng-48)
(DE83-013284; UCID-19759) Avail: NTIS HC A12/MF A01

Spatial and temporal profiles of the space potential in the central cell midplane of tandem mixing experiment (TMX) were obtained with a heavy in beam probe. The absolute accuracy of measurements is approximately + or - 25 volts (with respect to the machine vacuum walls) with a resolution of approximately 2 volts. During moderate fueling with the gas boxes, the plasma potential is parabolic to at least 25 cm radius. With puffer valve fueling, the space potential is relatively flat to at least 27 cm radius. The magnitude of the central cell potential on axis is consistent with the measured electron temperature (from Thomson scattering) and simple tandem mirror theory. The axial potential well depth, obtained by comparing the heavy ion beam probe measurements in the central cell with end loss analyzer measurements of the plug potential, indicate (at moderate fueling levels) a confining potential consistent with the Boltzmann relation. Author

N83-34780# California Univ., Livermore. Lawrence Livermore Lab.
THERMOCHEMICAL HYDROGEN PRODUCTION BASED ON MAGNETIC FUSION
Oscar H. Krikorian and Lloyd C. Brown (General Atomic Co., San Diego, Calif.) 10 Jun. 1982 21 p refs Presented at the World Hydrogen Energy Conf., Pasadena, Calif., 13 Jun. 1982
(Contract W-7405-eng-48)
(DE83-000739; UCRL-87718; CONF-820605-26) Avail: NTIS HC A02/MF A01

Conceptual design studies were carried out on an integrated fusion/chemical plant system using a Tandem Mirror Reactor fusion energy source to drive the General Atomic Sulfur-Iodine Water-Splitting Cycle and produce hydrogen as a future feedstock for synthetic fuels. Blanket design studies for the Tandem Mirror Reactor show that several design alternatives are available for providing heat at sufficiently high temperatures to drive the General Atomic Cycle. The concept of a Joule-boosted decomposer is introduced in one of the systems investigated to provide heat electrically for the highest temperature step in the cycle (the SO3 decomposition step), and thus lower blanket design requirements and costs. Flowsheeting and conceptual process designs have been developed for a complete fusion-driven hydrogen plant, and the information has been used to develop a plot plan for the plant and to estimate hydrogen production costs. DOE

N83-34781# KMS Fusion, Inc., Ann Arbor, Mich.
ATOMIC PHYSICS IN INERTIAL FUSION
J. T. Larson and D. J. Tanner 1982 19 p refs Presented at 6th Intern. Workshop on Laser Interaction and Related Phenomena, Monterey, Calif.
(Contract DE-AC08-82DP-40152)
(DE83-002544; KMSF-U-1270; CONF-821089-2) Avail: NTIS HC A02/MF A01

Some characterization of dense plasmas such as those encountered in IF experiments are described. The usual treatments of atomic structure and their impact on physical processes are shown to be incorrect for densities comparable to solid or higher. Thermodynamic information, thermal electron conduction, and radiative processes are all greatly affected on the short time scales involved in these plasmas. Simple analytical calculations are no longer possible. DOE

N83-34782# Department of Energy, Washington, D. C. Development and Technology Div.
SPECIAL-PURPOSE MATERIALS FOR MAGNETICALLY CONFINED FUSION REACTORS Annual Progress Report
Aug. 1982 118 p refs
(DE83-003922; DOE/ER-0113/1; APR-4) Avail: NTIS

HC A06/MF A01

Fusion reactor materials problems other than the first-wall and blanket structural materials are discussed. Components that are considered as special purpose materials include breeding materials, coolants, neutron multipliers, barriers for tritium control, materials for compression and OH coils and waveguides, graphite and SiC, heat-sink materials, ceramics, and materials for high-field (> 10-T) superconducting magnets. Crucial and generic materials problems that must be resolved if magnetic-fusion devices are to succeed are addressed. DOE

N83-34783# Princeton Univ., N. J. Plasma Physics Lab.
DISSIPATIVE EFFECTS ON FINITE-LARMOR-RADIUS MODIFIED MAGNETOHYDRODYNAMIC BALLOONING MODES
J. W. Connor, L. Chen, and M. S. Chance Nov. 1982 16 p refs
(Contract DE-AC02-76CH-03073)
(DE83-003905; PPPL-1957) Avail: NTIS HC A02/MF A01

Finite-ion-Larmor-radius (FLR) effects provide a band of additional stability for values beta (exactly equal to plasma pressure/magnetic pressure) exceeding the limit predicted for ideal magnetohydrodynamic (MHD) ballooning modes. The effect of particle collisions on the stable modes of the FLR modified ideal theory that exist in this range of beta values are examined. DOE

N83-34784# Princeton Univ., N. J. Plasma Physics Lab.
DIAGNOSTICS FOR HOT PLASMAS USING HYDROGEN NEUTRAL BEAMS
R. J. Goldston Dec. 1982 47 p refs
(Contract DE-AC02-76CH-03073)
(DE83-003904; PPPL-1952) Avail: NTIS HC A03/MF A01

Neutral hydrogen beams can be used to determine plasma line density, based on simple attenuation measurements. This technique was applied to the study of beam-injected mirror plasmas. Neutral beams are also used in a number of Tokamaks to supply a local increase of the neutral atom target density for charge exchange. By directing a time-modulated neutral beam across the sight-line of a charge-exchange analyzer, and measuring the modulated neutral particle efflux from the plasma, local measurements of the ion energy distribution function can be made. If a modulated diagnostic neutral beam is directed across the sight-line of an ultra-violet spectrometer, the local densities and possibly velocity distributions of fully stripped impurities can be measured. The fast hydrogen neutrals charge exchange with fully stripped impurities in the plasma, leaving the impurities in excited hydrogen-like states. In their prompt radiative decay the impurity ions emit characteristics UV lines, which can be detected easily. DOE

N83-34785# Princeton Univ., N. J.
RADIO-FREQUENCY WAVE TRAJECTORIES FOR CURRENT DRIVE IN TOKAMAK REACTORS
K. L. Wong Dec. 1982 30 p refs
(Contract DE-AC02-76CH-03073)
(DE83-005051; PPPL-1961) Avail: NTIS HC A03/MF A01

Detailed ray tracing calculations were carried out for three modes of waveguide-launched radio-frequency waves for Tokamak reactor parameters to evaluate their applicability for steady state current drive. The merits and demerits of each mode are discussed. DOE

N83-34786# California Univ., Livermore. Lawrence Livermore Lab.
ATOMIC PROCESSES IN HIGH-DENSITY PLASMAS
R. M. More 1982 43 p refs Presented at the NATO Workshop Conf. on Atomic and Mol. Processes in Controlled Fusion, Palermo, Sicily, 19-30 Jul. 1982 Submitted for publication
(Contract W-7405-eng-48)
(DE83-007360; UCRL-88511; CONF-820731-3) Avail: NTIS HC A03/MF A01

Dense atomic plasmas such as that produced in inertial confinement fusion are reviewed. The target implosion physics along with the associated atomic physics, i.e., free electron collision phenomena, electron states I, electron states II, and nonequilibrum plasma states are described. DOE

N83-34787# California Univ., Livermore. Lawrence Livermore Lab.
SCALING OF LASER-PLASMA INTERACTIONS WITH LASER WAVELENGTH AND PLASMA SIZE
C. E. Max, E. M. Campbell, W. C. Mead, W. L. Kruer, D. W. Phillion, R. E. Turner, B. F. Lasinski, and K. G. Estabrook 25 Jan. 1983 21 p refs Presented at the 6th Intern. Workshop on Laser Interaction and Related Plasma Phenomena, Monterey, Calif., 25 Oct. 1982
(Contract W-7405-eng-48)
(DE83-010103; UCRL-88056; CONF-821089-9) Avail: NTIS HC A02/MF A01

Plasma size is an important parameter in wavelength scaling experiments because it determines both the threshold and potential gain for a variety of laser plasma instabilities. Most experiments to date have of necessity produced relatively small plasmas, due to laser energy and pulse length limitations. Three experiments which had large enough plasmas that some instability thresholds were exceeded or approached are discussed. Evidence for Raman scatter, filamentation, and the two plasmon decay instability needs to be confirmed in experiments which measure several instability signatures simultaneously, and which produce more quantitative information about the local density and temperature profiles. DOE

N83-34788# General Atomic Co., San Diego, Calif.
RENORMALIZATION AND THE BREAKUP OF MAGNETIC SURFACES
J. M. Greene Feb. 1983 33 p refs Presented at the 11th Texas Symp. on Relativistic Astrophys., Austin, Tex., 12 Dec. 1982
(Contract DE-AT03-76ET-51011)
(DE83-009267; GA-A-16985; CONF-821227-2) Avail: NTIS HC A03/MF A01

Considerable progress in the last few years on problems that are equivalent to finding the global structure of magnetic field lines in toroidal systems was made. A general problem of this class has a solution that is so complicated that it is impossible to find equations for the location of a field line which are valid everywhere along an infinitely long line. However, recent results are making it possible to find the asymptotic behavior of such systems in the limit of long lengths. This is just the information that is desired in many situations, since it includes the determination of the existence, or nonexistence, of magnetic surfaces. The key to present understanding is renormalization. DOE

N83-34789# Oak Ridge National Lab., Tenn. Fusion Engineering Design Center.
FED-R: A FUSION ENGINEERING DEVICE UTILIZING RESISTIVE MAGNETS
D. L. Jassby, ed. and S. S. Kalsi, ed. Apr. 1983 296 p refs
(Contract W-7405-eng-26)
(DE83-009765; ORNL/FEDC-82/1) Avail: NTIS HC A13/MF A01

The principal purpose of the FED-R Tokamak facility is to provide a substantial quasi-steady flux of fusion neutrons irradiating a large test area in order to carry out thermal, neutronic, and radiation effects testing of experimental blanket assemblies having a variety of configurations, compositions, and purposes. The design of the FED-R device also suggests potential for a upgrade that could be employed as a full scale demonstration reactor for some specific fusion neutron application when required. DOE

N83-34790# California Univ., Livermore. Lawrence Livermore Lab.
INERTIAL CONFINEMENT FUSION WITH DIRECT ELECTRIC GENERATION BY MAGNETIC FLUX COMPRESSION
George P. Lasche 1983 7 p refs Presented at the 5th Topical Meeting on Technol. of Fusion Energy, Knoxville, Tenn., 26-28 Apr. 1983
(Contract W-7405-eng-48)
(DE83-009814; UCRL-88210; CONF-830406-8) Avail: NTIS HC A02/MF A01

A high power density laser fusion reactor concept in investigated in wich directed kinetic energy imparted to a large mass of liquid lithium in which the fusion target is centrally located is maximized. In turn, this kinetic energy is converted diectly to electricity with, potentially, very high efficiency by work done against a pulsed magnetic field applied exterior to the lithium. Because the concept maximizes the blanket thickness per unit volume of lithium, neutron induced radioactivities in the reaction chamber wall are many orders of magnitude less than is typical of D-T fusion reactor S concepts. DOE

N83-34791# California Univ., Los Angeles. Center for Plasma Physics and Fusion Engineering.
REVIEW OF UCLA PLASMA MATERIALS INTERACTION RESEARCH ACTIVITIES
25 Oct. 1982 61 p
(Contract DE-AT03-80ER-52062)
(DE83-010050; DOE/ER-52062/T4) Avail: NTIS HC A04/MF A01

Data are given for each of the following topics: model development for particle and heat fows in plasma edge; coupling of atomic and surface physics data; role of neutral transort, design, analysis and results of plasma edge experiment with slotted pump limiter in MACROTOR; input to FED/INTOR on advanced limiter design and analysis, models for pumped limiter neutral atom flows, and advanced limiter test-l; UCLA activities. DOE

N83-34792# Illinois Univ., Urbana-Champaign. Nuclear Engineering Program.
COMPUTATIONAL STUDIES OF OHMIC HEATING IN THE SPHEROMAK Ph.D. Thesis
Richard Edward Olson 1983 184 p refs
(Contract DE-AC02-76ET-52040)
(DE83-013015; DOE/ET-52040/T10; COO-2218-267) Avail: NTIS HC A09/MF A01

Time dependent computational simulations using both single fluid O-D and two fluid 1 1/2-D models are developed for and utilized in an investigation of the ohmic heating of a spheroman plasma. The plasma density and composition, the applied magnetic field strength, the plasma size, and the plasma current density profile are considered for their effects on the spheromak heating rate and maximum achievable temperature. The feasibility of ohmic ignition of a reactor size spheromak plasma is also considered. DOE

N83-34793# California Univ., Livermore. Lawrence Livermore Lab.
DESIGN CONSIDERATIONS FOR DIRECT-ILLUMINATION-DRIVEN INERTIAL-FUSION REACTORS
Jack Hovingh 1983 15 p refs Presented at the 5th Topical Meeting on Technol. of Fusion Energy, Knoxville, Tenn., 26-28 Apr. 1983
(Contract W-7405-eng-48)
(DE83-010928; UCRL-88215; CONF-830406-52) Avail: NTIS HC A02/MF A01

This study parametrically examines the implications on inertial-fusion-reactor design of the use of direct-drive pellets as an alternative to the radiation-driven targets. We have examined the impacts of direct illumination on mirror damage constraints, reactor neutronic performance, and system energetics and cost. The capital costs for low f/number, direct-illumination-driven inertial-fusion power plants are required to be significantly less than those for the radiation-driven or high f/number direct-illumination-driven power plants to produce electricity at the same cost. DOE

N83-34794# Electricite de France, Chatou. Div. Conversion Electrochimique.
CHAPTERS IN THE INDUSTRIAL HISTORY OF PLASMA ARCS: THE PRECURSORS (1800-1900); FIXATION OF ATMOSPHERIC NITROGEN (1898-1920) [CHAPITRES DE L'HISTOIRE INDUSTRIELLE DES PLASMAS D'ARC: LES PRECURSEURS (1800-1900), LA FIXATION DE L'AZOTE ATMOSPHERIQUE (1898-1920)]
Christian Bailleux Dec. 1981 31 p In FRENCH
(HP-53/81/15) Avail: NTIS HC A03/MF A01

Early experiments involving plasma arc discharges are recalled, including Humphry Davy's electric egg, and Birkeland's disastrous attempt to build an electric cannon. The development of arc furnaces is traced, and the search for new sources of nitrogen at the turn of the century is described. Author (ESA)

N83-34795# Stockholm Univ. (Sweden). Inst. of Physics.
RF GLOW DISCHARGES AND SPUTTERING
P. G. Larsson Jun. 1983 26 p refs
(USIP-83-05) Avail: NTIS HC A03/MF A01

Basic mechanisms in low pressure plasmas that affect the construction of electrode assemblies are reviewed. The systems considered are nonmagnetic. The voltage division in an RF discharge, RF and dc potentials across a dark space sheath, ion current density, target sheath thickness, and the sputtering process are treated. A solution to the construction of an electrode assembly is presented. Author (ESA)

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N83-34796* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PIEZOELECTRIC COMPOSITE MATERIALS Patent
Louis J. Kiraly, inventor (to NASA) Issued 23 Aug. 1983 4 p Filed 12 Jul. 1982 Supersedes N82-31450 (20 - 22, p 3102)
(NASA-Case-LEW-12582-1; US-Patent-4,400,642;
US-Patent-Appl-SN-397281; US-Patent-Class-310-332;
US-Patent-Class-310-800; US-Patent-Class-428-294;
US-Patent-Class-428-421; US-Patent-Class-428-422) Avail: US Patent and Trademark Office CSCL 20L

A laminated structural devices has the ability to change shape, position and resonant frequency without using discrete motive components. The laminate may be a combination of layers of a piezoelectrically active, nonconductive matrix material. A power source selectively places various levels of charge in electrically conductive filaments imbedded in the respective layers to produce various configurations in a predetermined manner. The layers may be electrically conductive having imbedded piezoelectrically active filaments. A combination of layers of electrically conductive material may be laminated to layers of piezoelectrically active material. Official Gazette of the U.S. Patent and Trademark Office

N83-34797# Rockwell International Corp., Thousand Oaks, Calif. Microelectronics Research and Development Center.
LSI/VLSI ION IMPLANTED GaAs IC PROCESSING Quarterly Technical Report, 1 Feb. - 30 Apr. 1982
R. Zucca and A. Fistenberg Jan. 1983 23 p
(Contract F49620-80-C-0101; AF Proj. 3384-4)
(AD-A126800; AFOSR-83-0224TR; QTR-7) Avail: NTIS HC A02/MF A01 CSCL 09/5

During this reporting period, growth of low dislocation GaAs crystals by the horizontal Bridgman method is reported. LEC semi-insulating substrate material from a commercial supplier of 3 inch diameter wafers was evaluated finding that three out of four ingots passed the qualification tests. The major process activities centered on the testing of processing equipment before the start of the 3 inch process line. Excellent results in terms of resolution and alignment accuracy of the CENSOR direct step on water projection aligner are reported. Author

N83-34798# North Carolina State Univ., Raleigh. Dept. of Materials Engineering.
FUNDAMENTAL STUDIES OF GROWTH, DOPING AND TRANSFORMATION IN BETA SILICON CARBIDE Annual Report
Robert F. Davis and H. H. Stadelmaier Mar. 1983 27 p
(Contract N00014-82-K-0182; NR Proj. 243-027)

(AD-A126622; NCSU-243-043-0102) Avail: NTIS HC A03/MF A01 CSCL 20/2

High quality beta SiC thin films currently being grown for future microelectronic applications using chemical vapor deposition techniques are discussed. Additional efforts now underway or planned in this overall effort and described include ion implantation and annealing as well as in-situ incorporation of electronically active dopants; ion microprobe analyses of these doped materials; ion channeling; Raman spectroscopy; Hall and Hg-probe electrical measurements; and high temperature X-ray diffraction studies and transmission electron microscopy to determine the effect of impurities of the Beta-Alpha transformation. R.J.F.

N83-34799# Illinois Univ., Urbana. Dept. of Physics.

MEASUREMENT OF HIGH MOBILITIES AND STRAIN CONFINEMENT OF LONG-LIVED FREE EXCITIONS IN Cu SUB 2 O Interim Scientific Report

James P. Wolfe 10 Jan. 1983 14 p refs

(Grant AF-AFOSR-0124-79; AF Proj. 2301)

(AD-A128486; AFOSR-83-0381TR) Avail: NTIS HC A02/MF A01 CSCL 20/12

One of the long range goals of this project has been to produce a photoexcited exciton system which displays quantum statistics. A method is made to produce excitons in a superconducting or superfluid state. One of the prime difficulties in achieving this goal is that excitons in direct gap semiconductors generally have very short lifetimes, of order 1 nanosecond, which is not long enough to permit their kinetic energies to come into equilibrium with the lattice temperature. On the other hand, the direct gap semiconductor exhibits excitons with very small Bohr radii advantageous to observing quantum statistics. To circumvent the lifetime problem stated above, high purity crystals of Cu2O, which recently were shown to display excitonic lifetimes in the microsecond range have been studied. GRA

N83-34800# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

LUMINESCENCE AND ELECTRICAL CHARACTERIZATION OF ION IMPLANTED Si:Tl Ph.D. Thesis. Final Technical Report, Jan. 1980 - Jan. 1982

Orven F. Swenson AFWAL 18 Aug. 1983 137 p refs

(AF Proj. 2306)

(AD-A128417; AFIT/DS/PH/82-1; AFWAL-TR-82-4115) Avail: NTIS HC A07/MF A01 CSCL 20/12

Ion implanted Si:Tl was characterized by luminescence, Hall-effect, Rutherford Backscattering (RBS), and Secondary Ion Mass Spectrometry (SIMS). This is the first reported luminescence study of an implanted dopant in silicon. The same sharp line defects were produced by the Tl heavy ion implants as identified in previous light ion studies. The defects produced by the ion implantation were removed and the Tl activated by a two-step anneal procedure. A high quality annealed implant layer was produced from which the four excited states of the Tl bound exciton no-phonon could be resolved. An unidentified bound exciton peak related to the Tl acceptor was observed for the first time in both ion implanted and bulk grown Si:Tl. Temperature dependent Hall-effect measurements were made on the implant layers which indicate that Hall-effect measurements made only at room temperature are not valid in general for silicon implant layers. The Hall data and luminescence data both indicate that the concentration of activated Tl increases with increasing second anneal temperature. The Hall-mobility varied as T-2.4 for implanted Si:Tl in the temperature range 135-165K. The ionization energy was determined to be 229 meV by Hall-effect measurements in the compensated temperature region. GRA

N83-34801# Eltron Research, Inc., Naperville, Ill.

CHARACTERIZATION OF ILLUMINATED SEMICONDUCTOR/SOLID-ELECTROLYTE JUNCTIONS: PHOTOELECTROCHEMICAL INVESTIGATION OF A POLY(ETHYLENE OXIDE) CELL Interim Technical Report, 1 Mar. - 30 Apr. 1983

Anthony F. Sammells and Peter G. P. Ang 1 May 1983 15 p refs

(Contract N00014-83-C-0108)

(AD-A128646; Rept-0001AC) Avail: NTIS HC A02/MF A01 CSCL 20/12

Photoelectrochemical effects have been observed with solid-state cells using a poly(ethylene oxide). NaSCN solid polymer electrolyte containing a Na2S/S redox couple. Photoeffects were observed at the interface of this electrolyte with p-InP, n-GaAs, and in a two-photoelectrode cell of configuration p-InP/PEO-NaSCN, Na2S,S/n-CdS. In this latter cell, photopotentials of 540 mV were generated using 100 mW/sq cm quartz iodine illumination. Author (GRA)

N83-34802# Lincoln Lab., Mass. Inst. of Tech., Lexington. Solid State Div.

SOLID STATE RESEARCH Quarterly Technical Summary Report, 1 Nov. 1982 - 31 Jan. 1983

Alan L. McWhorter 15 Feb. 1983 119 p refs

(Contract F19628-80-C-0002; AF Proj. 649L)

(AD-A128894; ESD-TR-83-001; REPT-1983-1) Avail: NTIS HC A06/MF A01 CSCL 05/1

This report covers in detail the solid state research work of the Solid State Division at Lincoln Laboratory for the period 1 November 1982 through 31 January 1983. The topics covered are Solid State Device Research, Quantum Electronics, Materials Research, Microelectronics, and Analog Device Technology. Funding is primarily provided by the Air Force, with additional support provided by the Army, DARPA, Navy, NASA, and DOE. Author (GRA)

N83-34803# Harvard Univ., Cambridge, Mass. Div. of Applied Sciences.

THE I-V CURVES OF SUPERCONDUCTING MICROCONSTRICTIONS Interim Report

Greg E. Blonder Sep. 1982 156 p refs

(Contracts N00014-77-C-0085; N00014-75-C-0648; Grant NSF DMR-79-04155; NR Proj. 372-012; NR Proj. 319-116)

(AD-A128876; TR-19) Avail: NTIS HC A08/MF A01 CSCL 20/12

In recent years there has been much experimental and theoretical work on small-area high-current-density superconducting junctions, since such junctions have advantages for certain practical applications. Although the I-V curve properties of classic (high barrier) tunnel junctions have long been understood in great detail, the properties of metallic (no barrier) junctions have been studied only more recently and in less detail, and the transitional case (small barrier) has received practically no attention at all. Here the authors present a new unified treatment which is sufficiently general to embrace both limits, as well as the intermediate regime. In this work, they confine their attention primarily to the N-S interface within the context of a generalized Andreev reflection model. This avoids the complications of the Josephson effect, while allowing for the complete delineation of the I-V curves including the so-called excess current at high voltages, as it increases from zero in tunnel junctions to lits limiting value in clean metallic contacts. In addition, by suitably joining two N-S interfaces together as a model for the S-S interface, the authors have discovered a physically plausible explanation for the subharmonic energy gap structure that has been observed in the I-V curves of a wide variety of microconstrictions. GRA

N83-34804# McElroy (Ralph) Co., Austin, Tex.

CALCULATION OF MULTIFREQUENCY COEFFICIENTS OF AB-TYPE CRYSTALS USING EQUIVALENCE ORBITAL METHOD

Chen Zhuangtian and Shen Hesen May 1983 27 p refs Transl. into ENGLISH from Acta Phys. Sinica (China), v. 31, no. 8, Aug. 1982 p 1046-1055 Sponsored by DOE Prepared for California Univ., Lawrence Livermore Lab.

(DE83-012906; UCRL-Trans-11864) Avail: NTIS HC A03/MF A01

On the basis of neglecting electron sound particle interactions, in the present paper an investigation was done on the possibility of the calculation of multifrequency coefficients of AB-type crystals

from energy band wave functions. By using the AB-type crystal energy band approximation method, the equivalence orbital method, the multifrequency coefficient at the point k = 0 was calculated. Through the band width correction, the multifrequency coefficient at the point k = 0 was made to represent approximately the average of multifrequency coefficients at different k points. This average value multiplied by the total number of k points in the first Brian region will be the macroscopic multifrequency coefficient of the crystal. Multifrequency coefficients of 17 sphalerite type and wurtzite type crystals were calculated. The agreement between the calculated values and the experimental values was quite satisfactory. B.W.

N83-34805# Illinois Univ., Urbana. Dept. of Physics.
TUNNELING AND MIGRATION OF THE DUMBBELL DEFECT IN ELECTRON-IRRADIATED ALUMINUM-ZINC ALLOYS Ph.D. Thesis
Patrick Walter Wallace 1983 100 p refs
(Contract DE-AC02-76ER-01198)
(DE83-013651; DOE/ER-01198/T2) Avail: NTIS HC A05/MF A01

Ultrasonic attenuation and velocity measurements were made on irradiated Al-Zn alloys (Zn concentrations of .01%, .1%, and .5% atomic). They provide strong evidence for a tunneling relaxation of the predominant mixed dumbbell defect at low temperatures, and for mixed dumbbell migration at the Stage II anneal temperature. The effect of an internal strain varying with the zinc concentration on the measured decrement and modulus change is striking. Evaluated in the framework of a six level system, this reveals the simultaneous action of resonance and nonclassical relaxation processes. Using Fe as a probe atom, it is shown that mixed dumbbell dissociation is in an insignificant component of the annealing of this defect. The decrease of the annealing temperature at higher zinc concentrations provides evidence that the mixed dumbbell migrates as a unit during annealing. The energies associated with dumbbell migration and interstitial escape are derived. DOE

N83-34806# Emory Univ., Atlanta, Ga. Dept. of Physics.
FAR INFRARED STUDIES OF SUPERCONDUCTING V/SUB 3/Si, Nb/SUB 3/Ge, AND Nb Progress Report
Sidney Perkowitz 1982 7 p refs
(Contract DE-AS05-79ER-10436)
(DE83-005588; DOE/ER-10436/3) Avail: NTIS HC A02/MF A01

Modulated laser thermal spectroscopy was used. Measurements on Nb were not reproducible. Data on homogeneous NbN films can be fitted with the Laplace extension of BCS theory. Granular NbN films show indications of superconducting grains. DOE

N83-34807# Argonne National Lab., Ill.
SCATTERING OF FAST NEUTRONS FROM ELEMENTAL MOLYBDENUM
A. B. Smith and P. T. Guenther Nov. 1982 24 p refs
(Contract W-31-109-eng-39)
(DE83-005919; ANL/NDM-76) Avail: NTIS HC A02/MF A01

Differential broad resolution neutron scattering cross sections of elemental molybdenum were measured at 10 to 20 scattering angles distributed between 20 and 160 degrees and at incident neutron energy intervals nearly equal to 50 to 200 keV from 1.5 to 4.0 MeV. Elastically scattered neutrons were fully resolved from inelastic events. Lumped level inelastic neutron scattering cross sections were determined corresponding to observed excitation energies of; 789 + - 23, 195 + - 23, 1500 + - 34, 1617 + - 12, 1787, 1874, 1991, 2063 + - 24, 2296, 2569 and 2802 keV. An optical statistical model was deduced from the measured elastic scattering results. The experimental values were compared with the respective quantities given in ENDF/B-V. DOE

N83-34808# Brookhaven National Lab., Upton, N. Y.
RECENT PROGRESS IN COMMENSURATE-INCOMMENSURATE PHASE TRANSFORMATIONS
J. D. Axe Aug. 1982 22 p refs Presented at the 6th Yamada Conf. on Neutron Scattering of Condensed Matter, Tokyo, 1 Sep. 1982
(Contract DE-AC02-76CH-00016)
(DE83-000217; BNL-31797; CONF-820985-6) Avail: NTIS HC A02/MF A01

Three topics are discussed: (1) the nature of long wavelength excitations in Hg2-delta AsF6 where gapless excitations in addition to the conventional acoustic modes are observed; (2) Thiourea, in which new commensurate phases can be induced by an external electric field; (3) Discommensurations in 2HTaSe2 where recent electron diffraction and high resolution X-ray data combine with neutron results to establish a quite complex and subtle behavior. DOE

N83-34809# Los Alamos Scientific Lab., N. Mex.
CRYSTALLIZATION OF SILICON FILMS ON GLASS: A COMPARISON OF METHODS
Ross A. Lemons, Martin A. Bosch (Bell Telephone Labs.), and Dieter Herbst (Bell Telephone Labs.) 1982 13 p refs Presented at the 6th Intern. Symp. on the Sci. Basis for Radioactive Waste Management, Boston, 1 Nov. 1982
(Contract W-7405-eng-36)
(DE83-006054; LA-UR-83-144; CONF-821107-45) Avail: NTIS HC A02/MF A01

The lure of flat panel displays has stimulated much research on the crystallization of silicon films deposited on large-area transparent substrates. In most respects, fused quartz is ideal. It has high purity, thermal shock resistance, and a softening point above the silicon melting temperture. Unfortunately, fused quartz has such a small thermal expansion that the silicon film cracks as it cools. This problem has been attacked by patterning with islands or moats before and after crystallization, by capping, and by using silicate glass substrates that match the thermal expansion of silicon. The relative merits of these methods are compared. Melting of the silicon film to achieve high mobility has been accomplished by a variety of methods including lasers, electron beams, and strip heaters. For low melting temperature glasses, surface heating with a laser or electron beam is essential. Larger grains are obtained with the high bias temperature, strip heater techniques. DOE

N83-34810# Cornell Univ., Ithaca, N.Y. Dept. of Materials Science and Engineering.
DIFFRACTION AND MICROSCOPY STUDIES OF THE STRUCTURE OF GRAIN BOUNDARIES IN Fe, Fe-BASE ALLOYS AND CERAMIC MATERIALS Progress Report
S. L. Sass Mar. 1983 9 p
(Contract DE-AC02-81ER-10956)
(DE83-009583; DOE/ER-10956/3) Avail: NTIS HC A02/MF A01

The Fe and NiO single crystals were prepared in the course of preparing bicrystals. Diffraction technique was studied for detecting the expansion at a grain boundary. The structure of low angle tilt boundaries in NiO was studied using an electron microscopic technique. DOE

N83-34811# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
ELECTRON-IMPACT DISSOCIATION OF IRON PENTACARBONYL AND FORMATION OF THIN FILMS
Brian Carleton Hale Jan. 1983 92 p refs
(Contract DE-AC03-76SF-00098)
(DE83-009982; LBL-15708) Avail: NTIS HC A05/MF A01

The fluorescence yield from electron impact dissociation of Fe(CO)5 in a semieffusive beam was studied and compared favorably with a limited degree of freedom statistical dissociation model for an excitation energy of 100 eV. An absorption cross section was measured to be 4.7 A(2) + - 0.4 A(2). A quantum fluorescence yield measured 2 x 10(+4) at an electron energy of 100 eV. Thin iron films were formed from Fe(CO)5 on glass surfaces using a mercury/xenon high pressure arc lamp. The kinetics of this process were studied by measuring the increase in pressure due to the dissociation of Fe(CO)5. The rate of dissociation closely followed the rate equation for dissociation by both photolysis and

electron dissociative attachment due to low-energy electrons emitted by the surface. DOE

N83-34812# Argonne National Lab., Ill. Materials Science and Technology Div.
VOID FORMATION AND SOLUTE SEGREGATION IN ION-IRRADIATED NIOBIUM-BASE ALLOYS
B. A. Loomis and S. B. Gerber Oct. 1982 28 p refs Presented at the Fall Meeting of TMS-AIME, St. Louis, 25-28 Oct. 1982 Submitted for publication
(Contract W-31-109-eng-38)
(DE83-007682; CONF-821049-13) Avail: NTIS HC A03/MF A01

The void-volume fraction in unalloyed Nb and Nb-base binary alloys containing either approx. 2.4 a/o Mo, Ti, Zr, Hf, Ni, Fe, V, or Ta has been determined following 3.0-MeV (58)Ni( ) ion irradiation at 1225 K to approx. 50 dpa. also, the thermal- and irradiation-induced segregation of these substitutional-atom solutes and the intrinsic, interstitial-O impurity (approx. 0.06 a/o) to the specimen surface and within the irradiation-damaged layer have been determined. The void-volume fraction and the segregation of solutes have been shown to be correlated by the solute diffusivity and the relative chemical affinity of the substitutional solutes for O. The correlated diffusion of vacancy defects and O atoms is postulated to explain the experimental results. DOE

N83-34813# Argonne National Lab., Ill. Materials Science Div.
MAGNETIC PROPERTY CHANGES IN EPITAXIAL METAL-FILM SANDWICHES
M. B. Brodsky Aug. 1982 22 p refs Presented at the 10th Intern. Colloq. on Magnetic Films and Surfaces (ICMFS 10), Yokohama, Japan, 13-16 Sep. 1982
(Contract W-31-109-eng-38)
(DE83-007664; CONF-8209106-1) Avail: NTIS HC A02/MF A01

Epitaxial metal film sandwiches (EMFS) containing Pd or Cr, were prepared between single crystal Ag or Au. The modified Pd/Cr show major changes in physical properties. The Pd has a stretched lattice parameter in Au-Pd-Au, which combines with a tetragonal distortion to cause exchange enhancements up to 28,000 and spin fluctuation temperatures of 1 to 10 K. In Au-Cr-Au, Cr takes up the fcc structure, leading to superconductivity due to a high N(E/sub F/). The results are contrasted to data for Ag-Pd-Ag and Ag-Cr-Ag EMFS. DOE

N83-34814# Arizona Univ., Tucson. Dept. of Physics and Optical Sciences.
SUPERCONDUCTIVITY IN ARTIFICIAL Nb/Cu HETEROSTRUCTURES
Charles M. Falco and Ivan K. Schuller 1982 9 p refs Presented at the Intern. Conf. on Superconductivity in D and F-Band Metals, Karlsruhe, West Germany, 28 Jun. 1982 Prepared in cooperation with Argonne National Lab., Ill.
(Contract W-31-109-eng-38)
(DE83-007747; CONF-820659-7) Avail: NTIS HC A02/MF A01

Transport and tunneling artificially prepared Nb/Cu heterostructures were measured. Samples had individual layers in the range 3.6 to 5000 A with total thickness approx. 1 (SIGMA)m. The dependence of T/sub c/ above 300 A layer thickness agrees well with proximity effect theory with no adjustable parameters. Below 300 A the data indicate the T/sub c/ of Nb decreases with layer thickness. The coupling strength 2(RADICAL)/kT/sub c/ exhibits a continuous decrease from the strong coupled value of approx. 3.8 (thick layers) toward the weak coupled value of approx. 3.5 (thin layers). No evidence is found for a change in the Nb LA and TA phonons energies from their bulk values down to approx. 10 A. Large changes in the phonon dispersion relation as a function of layer thickness in these materials are indicated. DOE

N83-34815# Los Alamos Scientific Lab., N. Mex. Materials Science and Technology Div.
THE RF PLASMA SYNTHESIS OF ULTRAFINE, ULTRAPURE SILICON CARBIDE POWDER
Charles M. Hollabaugh, Donald E. Hull, Lawrence R. Newkirk, and John J. Petrovic 1983 18 p refs Presented at the Intern. Conf. on Ultrastructure Processing of Ceramics, Glasses and Composites, Gainesville, Fla., 14 Feb. 1983
(Contract W-7405-eng-36)
(DE83-007551; LA-UR-83-367; CONF-830215-2) Avail: NTIS HC A02/MF A01

Ultrafine, ultrapure silicon carbide powder has been produced by reaction of silane and methane in a high temperature RF plasma. Preliminary studies include the effect of gas composition and of powder (plasma temperature) on the stoichiometry of the powder. The carbon-to-slicon ratio of the powder was varied from 1.0 to 1.9 by changing the process conditions. The powder has a BET surface rea of 101 m(2)/g, which is equivalent to a particle diameter of 18.5 nm. A particle size in the range of 10 to 20 nm was measured by transmission electron microscopy. X-ray diffraction results indicate a domain size of 7.5 nm and a crystal structure of beta (cubic) silicon carbide. Spectrographic analysis shows that metallic impurities are lower than high quality grade commercial powder. Because of the high surface area, the powder must be stored and processed in an inert atmosphere to prevent severe contaminaton with oxygen. DOE

N83-34816# California Univ., Berkeley. Lawrence Berkeley Lab.
MICROSTRUCTURE AND MAGNETIC PROPERTIES ON MnZn-FERRITE Ph.D. Thesis
I-Nan Lin Dec. 1982 135 p refs
(Contract DE-AC03-76SF-00098)
(DE83-009057; LBL-15434) Avail: NTIS HC A07/MF A01

Grain boundaries in MnZn-ferrites were characterized and their effects on the magnetic and electrical properties were investigated. Addition of CaO into MnZn-ferrite materials leads to the formation of secondary phases along the grain boundaries. The Ca addition does not produce beneficial effects on the electrical properties but only leads to a detrimental influence on the magnetic properties. Other microstructural features such as secondary phases and stacking faults will also affect the domain wall dynamics. Controlled atmosphere annealing improves drastically the apparent resistivity of the sintered MnZn-ferrites through the reduction of ferrous ions content but degrades the magnetic permeability. Control of the oxygen partial pressure at an earlier stage of processing rather than post fabrication annealing is needed in order to raise the intrinsic electrical resistivity of the bulk materials by reducing ferrous ion concentration without affecting the magnetic permeability detrimentally. DOE

N83-34817# California Univ., Berkeley. Lawrence Berkeley Lab.
A MODEL OF AMORPHOUS-SILICON-LAYER REGROWTH Ph.D. Thesis
Peiching Ling Jan. 1983 57 p refs
(Contract DE-AC03-76SF-00098)
(DE83-009145; LBL-15498) Avail: NTIS HC A04/MF A01

A new model which combines the heterogeneous nucleation and growth process for the mechanism of regrowth of amorphous silicon, in contact with a single crystal substrate, is presented. The model explains the effects of substrate orientation and impurity concentration on the kinetics of regrowth and also on the formation of twins during regrowth. The mechanism of redistribution of impurities and the formation of secondary defects during crystal regrowth are also discussed. A comparison of experimental results with the predictions of the model is also included. DOE

N83-34818# California Univ., Livermore. Lawrence Livermore Lab.
GENERALIZED PSEUDOPOTENTIAL THEORY OF d-BAND METALS
John A. Moriarty 1983 31 p refs Presented at the Sanibel Intern. Symp., Palm Coast, Fla., 7-12 Mar. 1983
(Contract W-7405-eng-48)
(DE83-009320; UCRL-88858; CONF-830327-1) Avail: NTIS HC A03/MF A01

The generalized pseudopotential theory of metals is reviewed. This theory, which attempts to rigorously extend to d-band metals the spirit of conventional simple metal pseudopotential perturbation

theory, was optimized and fully integrated with the Kohn-Sham local density functional formalism, allowing for systematic first principles calculations. Work on the problems of cohesion, lattice dynamics, structural phase stability, pressure and temperature-induced phase transitions, and melting is discussed. DOE

N83-34819# Sandia Labs., Albuquerque, N. Mex.
PLANAR DECHANNELING STUDIES OF STRAINED-LAYER SUPERLATTICE STRUCTURES
W. K. Chu (North Carolina Univ.), J. A. Ellison (New Mexico Univ.), S. T. Picraux, R. M. Biefeld, and G. C. Osbourn 1983 18 p refs Presented at the 6th Intern. Conf. on Ion Beam Analysis, Temple, Ariz., 22 May 1983 Sponsored in part by NSF
(Contract DE-AC04-76DP-00789)
(DE83-013307; SAND-83-0139C; CONF-830570-3) Avail: NTIS HC A02/MF A01

The influence of strain on the planar dechaneling of energetic particles in strained-layer superlattices (SLS) was investigated. MOCVD-grown GaAs/sub x/P/sub 1-x//GAP samples of (100) orientation and periodicity of 19 and 29 nm per layer were analyzed by MeV (4) He channeling. Dechanneling measurements at a 450 tilt from the (100) along (110) directions which are inclined to the surface normal reveal a much higher dechanneling than along (110) directions which contain the surface normal, consistent with the tetragononal distortions present due to the strain. A theoretical phase plane analysis of the planar dechanneling is developed and it is shown that the amount of dechanneling depends not only on the strain-induced angul shift at each interface, but also on the ratio of the layer period to the channeled particle wavelength. This ratio has been adjusted by nearly a factor of 2 by varying the beam energy from 0.6 to 2.0 MeV. Both experiment and theory demonstrate that when the wavelength matches the layer thickness, there is a strong enhancement in the planar dechanneling due to the focusing of the particles into the planes. DOE

N83-34820# Istituto Superiore di Sanita, Rome (Italy). Lab. di Fisica.
FINE STRUCTURES AT THE X-RAY L ABSORPTION EDGES OF ANTIMONY IN SbSi
E. Bernieri (Ist. Nazionale di Fisica Nucleare, Frascati, Italy), E. Burattini (Ist. Nazionale di Fisica Nucleare, Frascati, Italy), G. Cappuccio (CNR, Montelibretti, Italy), G. Dalba (Trento Univ., Italy), P. Fornasini (Trento Univ., Italy), M. Grandolfo, P. Vecchia, and Sh. M. Efendiev (Azerbaijan State Univ., Baku, USSR) Jun. 1982 17 p refs
(ISS-Fi-83/4) Avail: NTIS HC A02/MF A01

The fine structures at the absorption L edges of antimony in SbSI were observed in the paraelectric and ferroelectric phases. The X-ray absorption near edge structures at the L1 and L3 edges do not show any difference in shape and position due to the phase transition, indicating the lack of variations in the coordination symmetry and in the charge of the Sb ion. The analysis of the extended X-ray absorption fine structures permits discrimination of the first three coordination shells of antimony, and determines the value of the Sb-S mean distance both in the paraelectric and in the ferroelectric phase. The relative displacement of the two ions crossing the phase transition temperature was deduced and compared with the existing crystallographic values. Author (ESA)

N83-34821# Stockholm Univ. (Sweden). Inst. of Physics.
EXPERIMENTAL AND THEORETICAL STUDIES OF THE ELECTRONIC POPULATION OF IRON IN OCTAHEDRAL AND TETRAHEDRAL COMPLEXES
J. Blomquist, U. Helgeson, B. Folkesson (Lund Univ., Sweden), and R. Larsson (Lund Univ., Sweden) May 1983 20 p refs Sponsored by Swedish Natural Science Research Council
(USIP-83-04) Avail: NTIS HC A02/MF A01

Electron spectroscopy (ESCA) and Mossbauer measurements were performed on cyano, thiocyanato and halogeno complexes of iron. The experimentally determined electron populations of the iron atoms were compared to theoretical values calculated with a self consistent charge extended Huckel (EH-SCC) method. Combination of ESCA, Mossbauer and IR measurements gives a description of the electronic population of the iron atom that agrees well with EH-SCC theoretical calculations. The results also indicate a correlation between E2p binding energy, and effective atomic charge, particularly between E2p and the 3d occupation number. Author (ESA)

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N83-34822# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
THERMODYNAMIC AND FLOW MECHANICAL PROBLEMS IN AIRCRAFT AND SPACECRAFT DRIVES: SUMMARY OF WORK AND RESULTS FOR 1980, 81, 82 [THERMODYNAMISCHE UND STROEMUNGSMECHANISCHE PROBLEME DER LUFT- UND RAUMFAHRTANTRIEBE: ARBEITS- UND ERGEBNISBERICHT 1980-81-82]
1982 606 p refs In GERMAN
Avail: NTIS HC A99/MF A01

Laser interferometry; reaction kinetics study in exhaust gases by mass spectrometry, Raman spectroscopy and electron beams; and concentration and relaxation times measurements are discussed. Flow and combustion processes, and numerical calculation methods are considered, including jet mixing flow, compressor blade profile and supercritical cascade design; flow computation in counter-rotating cascades, in chemically reacting flows, in three-dimensional cascade flow, and in multistage turbomachines. The effect of Reynolds number on turbomachines is investigated. Combined chemical propulsion systems are analyzed. For individual titles, see N83-34823 through N83-34839.

N83-34823# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
INTERFEROMETRY [INTERFEROMETRIE] **c25**
G. Schwarz *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 1-16 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

A laser interferometer system was developed in order to measure general flow density fields with high accuracy. The measurement setup and its data evaluation and software procedures are described. Author (ESA)

N83-34824# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Stuttgart (West Germany).
ELEMENTARY REACTIONS DURING CxHy BURNING [ELEMENTARRIAKTIONEN BEI CxHy-VER-BRENNUNG] **c25**
Th. Just and H. H. Grotheer *In* Stuttgart Univ. Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 17-46 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

Methanol oxidation reactions were investigated for flame optimization by modeling, in order to assess the emission of toxic agents. Measurements on methanol elementary reactions are especially influenced by consecutive reactions. In the case of H3COH+O systems this is taken into account by an extensive reaction model. The velocity coefficient of the reaction H3COH+O is accurately obtained with this model. Laser induced fluorescence was used for the investigation of the reaction H3COH+OH. The velocity coefficient is deduced from the measurements, providing the temperature dependence. The HOCOH radical was observed with a mass spectrometer flow reactor. The measurements show that this radical reacts very slowly with O2. Author (ESA)

N83-34825# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Stuttgart (West Germany).
FLAME MEASUREMENTS USING ELECTRON BEAM FLUORESCENCE [FLAMMENDIAGNOSE DURCH ELEKTRONENSTRAHL-FLUORESZENZ] **c25**
Thomas Just and Hermann Eberius *In* Stuttgart Univ. Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82, 1982 p 47-86 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

Electron beam fluorescence was used as contactless diagnostic instrument to investigate reaction kinetics problems associated with the emission of toxic agents in exhaust gases. The time evolution of chemical reactions of an addition of gas in H2/O2 at low pressure was investigated for N2O+H yields N2+OH. Local concentrations and temperatures in the flame were determined from the fluorescence spectrum. For concentrations up to minimum 10%, a linear dependence exists between fluorescence intensity and the component concentration. Gas temperatures up to 780 K are determined in different gas mixtures and hot gas flows from the rotation spectra. Temperature profiles in the flames are measured as a function of the height above the burner. The reaction constant is also deduced. Author (ESA)

N83-34826# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Stuttgart (West Germany).
FLAME MEASUREMENTS USING RAMAN SPECTROSCOPY Final Report, 1974-1982 [FLAMMENDIAGNOSE DURCH RAMANSPEKTROSKOPIE] **c25**
Thomas Just and Winfried Stricker *In* Stuttgart Univ. Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 87-121 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

Raman spectroscopy was used to investigate flame kinetics in the visible and near ultraviolet spectra. Molecule concentrations up to 10 ppm at room temperature are measured. The local temperature is determined from rotation or rotation-vibration spectra, with an accuracy of + or - 3% for CW laser excitation and + or - 6% for pulsed laser excitation. Author (ESA)

N83-34827# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
CONCENTRATION MEASUREMENTS IN SUPERSONIC FLOWS WITH CHEMICAL REACTIONS USING MASS SPECTROMETRY [MASSENSPEKTROMETRISCHE EN IN UEBERSCHALLSTROEMUNGEN MIT CHEMISCHEN REAKTIONEN] **c25**
A. Frohn *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 122-136 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

Concentration measurements were used to study the evolution of chemical reactions in high temperature systems behind incident shock waves. In the test stand, the shock wave heated gas mixture expands in a vacuum measurement chamber through a nozzle system. In the resulting molecular beam, reaction product concentrations are determined with a quadrupole mass filter. Velocity constants are deduced from the time evolution of the concentrations. Author (ESA)

N83-34828# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
RELAXATION OF VIBRATIONAL DEGREES OF FREEDOM [RELAXATION VON SCHWINGUNGSFREIHEITSGRADEN] **c72**
A. Frohn *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 137-149 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

Shock tubes were used to measure relaxation times of the degrees of freedom in inelastic collisions of gas molecules. Design and construction of the experimental setup are described. For relaxation time measurements of vibrational degrees of freedom an initial pressure between 0.1 and 1 mbar is found to be optimal, and for dissociation between 1 and 10 mbar. The density gradients in the shock tube flow are measured with four differential laser interferometers and plotted with a transient recorder. A FORTRAN program was developed to determine the relaxation times. This measurement technique does not in general allow the degrees of freedom to be investigated separately. Author (ESA)

N83-34829# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Stuttgart (West Germany). Sonderforschungsbereich 85.
FLAME MEASUREMENTS USING COHERENT ANTI-STOKES RAMAN SCATTERING (CARS) [FLAMMENDIAGNOSE MIT CARS (COHERENT ANTI-STOKES RAMAN SCATTERING)] **c25**
Thomas Just and Winfried Stricker *In* Stuttgart Univ. Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 150-180 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

The experimental possibilities and limits of the CARS technique for flame measurements were investigated. The CARS method is explained and the experimental setup is described. A program was developed to calculate CARS-spectra, obtained with an interference filter-photomultiplier combination and a BOXCAR integrator, by comparing experimental CARS spectra with computer simulated spectra. The local temperature in hydrocarbon-air flames is determined from the spectra. The method is limited to diatomic molecules. The system does not allow precise temperature measurements which are exactly resolved in space. Author (ESA)

N83-34830# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
COMBUSTION [VERBRENNUNG] **c25**
J. Algermissen *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 183-219 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

The combustion process of hydrogen-air and hydrocarbon-air mixtures were experimentally investigated. Mass spectrometry and Raman spectroscopy were used with a molecular beam probe to take samples. Design and construction of the test stand are described. Qualitative concentration profiles in the flames are obtained with mass spectroscopy. Temperatures are deduced from Raman spectroscopic measurements with interference filters.
Author (ESA)

N83-34831# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
JET MIXING [STRAHLMISCHUNG] **c34**
Bernard Bauer *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 220-289 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

Turbulent mixing processes were experimentally investigated and compared with flow field calculations based on turbulence models. The flow characteristics in the mixing channel were measured with hot-wire anemometers. Several numerical methods and turbulence models were used to calculate the turbulent flow fields. It is shown that the value of these methods and models can only be demonstrated if precise and detailed experimental results are available. The present state of the models does not allow an efficient calculation of the mixing processes.
Author (ESA)

N83-34832# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
PROFILE DESIGN FOR CASCADES [PROFILENTWURE FUER GITTER] **c07**

F. X. Wortmann *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1983 p 290-324 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

Optimization calculations for blade profiles of subsonic axial compressors were made and the unsteady profile and cascade flow was calculated. The optimization aims at a highly loaded cascade behind the blades with a large constant velocity domain on the suction side. The instability point is calculated with a modified semiempirical van Driest theory. The boundary layer calculation is performed with the Walz-Geropp-Felsch integral method. The compressible flow is reduced to an incompressible flow with the Karman-Tsien rule. The pressure distribution along the profile is obtained for separated steady flow. The influence of separated flow on the cascade in relative motion is investigated by calculating the separated flow on a flat plate of finite thickness. Unsteady forces and moments on the profile are calculated.
Author (ESA)

N83-34833# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
COMPUTATION OF UNSTEADY COMPRESSIBLE FLOW THROUGH COUNTER-ROTATING FLAT BLADE CASCADES [BERECHNUNG DER INSTATIONAEREN KOMPRESSIBLEN STROEMUNG DURCH GEGENEINANDER BEWEGTE EBENE SCHAUFELGITTER] **c34**
K. Foerster *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecract Devices: Summary of Work and Results for 1980, 81, 82 1982 p 325-340 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

A mesh-free finite difference method was developed to calculate the flow in counter-rotating turbine blade cascades. The method is equivalent to the finite element method, even for the most complicated geometries. Accuracy and stability of the method are demonstrated. The application to frictionless flow in the cascades is efficient and easy. The application domain ranges from the subcritical to far into transonic flow regimes. The results show variations in the flow condition, which lie partly in the boundary layer critical domain. Author (ESA)

N83-34834# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
DESIGN OF SUPERCRITICAL BLADE CASCADES [ENTWURF SUPERKRITISCHER SCHAUFELGITTER] **c07**
E. Schmidt *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 341-378 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

A numerical method was developed for the design of supercritical blade cascades. The numerical process is made an order of magnitude faster by convergence inreasing and program-technical measures. The precision is greatly increased by local calculation mesh refinements, especially in domains with strong boundary value gradients. A boundary layer method checks if velocity distributions are separation-free, and obtains the profile contour from the potential flow contour of the calculated blade channel. An extensive plot software was developed to evaluate the numerical results. Author (ESA)

N83-34835# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
COMPUTATION OF CHEMICALLY REACTING FLOWS [BERECHNUNG CHEMISCH REAGIERENDER STROEMUNGEN] **c34**
J. Algermissen *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 379-393 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

A program system was developed to compute two-dimensional chemically reacting free jet flow. A calculation mesh which is invariant in time is introduced. The flow equations are transformed by the lambda scheme into the mesh for integration. The shock wave is treated by the shock-fitting method. The boundary conditions are taken into account by the post correction method. Velocity, pressure, temperature, and entropy distributions of the reacting mixture components in the flow field are calculated. Author (ESA)

N83-34836# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
TRANSONIC AND SUBSONIC COMPRESSORS [TRANSCHALL- UND UEBERSCHALLVERDICHTER] **c34**
Hans-Heiner Fruehauf *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 394-483 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

A three-dimensional numerical method was developed to compute the flow through turbomachine blade cascades in order to increase the efficiency of turbine components and to reduce the power comsumption. The turbulent transonic cascade flow is calculated in the case of strong interaction between main flow and boundary layer flow, resulting in an efficient and precise solution of the thin layer Navier-Stokes equations. Time-dependent Euler equations are obtained for subsonic and transonic flow through blade cascade subject to strong rotation. The frictionless aerodynamic quasi-two-dimensional interaction between two fixed cascades is accurately computed. A three dimensional computation of absolutely rotation-free subsonic and transonic flow through cascade is made. Author (ESA)

N83-34837# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
PROPULSION SYSTEMS: STUDY OF AEROTHERMODYNAMIC PROCESSES, AND EVALUATION OF PROPULSION COMPONENTS AND PROPULSION SYSTEMS [ANTRIEBSSYSTEME: AERO-THERMODYNAMISCHE PROZESS- UND BEWERTUNGS-STUDIE VON ANTRIEBSKOMPONENTEN UND -SYSTEMEN] **c20**
Peter A. Kramer *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 484-533 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

Numerical calculation methods were developed to analyze combined propulsion systems and their components, and to investigate their optimal use. Chemical propulsion systems for space tasks with strongly changing flight conditions are compared with turboramjet systems. The numerical results of total systems investigation show that ballistic, gravity-turn takeoff has only minor advantages and that the injection mass in the orbit increases by about 47% in optimal conditions. Author (ESA)

N83-34838# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
THE EFFECT OF THE REYNOLDS NUMBER ON TURBOMACHINES [REYNOLDSZAHLEINFLUSS AUF STROEMUNGSMASCHINEN] **c07**
W. Huck *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 534-556 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

A method to predetermine the behavior of compressors in a broad Reynolds number domain was developed. The blade geometry in the middle cross section or in several coaxial cross sections has to be known. The numerical calculation uses the duct flow method. Semiempirical correlations are used for the energy conversion in the cascade. The influence of the Reynolds number on energy loss and cascade deflection occurs especially for small Mach numbers and standard streaming angles. The high losses occurring for large angles and Mach numbers do not

considerably increase with decreasing Reynolds number. A comparison between measured and calculated flow characteristics shows that the numerical method must be improved. Author (ESA)

N83-34839# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
COMPUTATION OF THE FLOW THROUGH MULTISTAGE TURBOMACHINES TAKING INTO ACCOUNT FLOW LOSSES AND HEAT FLUXES [BERECHNUNG DER STROEMENG DURCH: MEHRSTUFIGE TURBOMASCHINEN UNTER BERUECKSICHTIGUNG VON STROEMUNGSVERLUSTEN UND WAERMEFLUESSEN] c34
W. Braig *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 1982 p 557-594 refs In GERMAN (For primary document see N83-34822 22-77)
Avail: NTIS HC A99/MF A01

The steady flow through turbomachines was computed using the axisymmetric model which allows the calculation of purely subsonic and purely transonic flow. The transport equations take into account flow losses, friction effects and heat fluxes. The numerical solution is obtained with the finite difference method. Transitions from subsonic into transonic flow and vice versa are simulated with a high convergence rate. Transonic stages for which no transonic phenomena occur in the cascade domain are calculated with the axisymmetric method, using correction terms to take nonaxisymmetric effects into account. Author (ESA)

N83-34840# California Univ., Los Angeles. Dept. of Atmospheric Sciences.
A FOURTH ORDER ENERGY AND POTENTIAL ENSTROPHY CONSERVING DIFFERENCE SCHEME Final Report, Sep. 1978 - Sep. 1981
Kenji Takano and M. G. Wurtele Jun. 1982 87 p refs
(Contract F19628-78-C-0129)
(AD-A126626; AFGL-TR-82-0205) Avail: NTIS HC A05/MF A01 CSCL 10/1

A horizontal difference scheme that conserves both potential enstrophy and energy for general flow and, in addition, yields fourth-order accuracy for the advection of potential vorticity in case of nondivergent flow, is derived for the shallow water equations on the staggered grid as a simple extension of the second-order potential enstrophy and energy conserving scheme presented by Arakawa and Lamb (1981). This fourth-order scheme is derived both for a Cartesian grid and for a spherical grid. Comparison by means of numerical experiments between the newly derived scheme and the second-order scheme showed the distinct advantage of the new scheme in giving better development and faster moving speed of the law. Author

N83-34841# Oak Ridge Y-12 Plant, Tenn. Y-12 Product Certification Div.
GENERALIZED ANALYSIS FOR MERCURY POROSIMETRY
R. W. Smithwick, III 12 Aug. 1982 21 p refs
(Contract W-7405-eng-26)
(DE83-004703; Y/DK-294) Avail: NTIS HC A02/MF A01

A method of analyzing mercury porosimetry data is described without specifying a particular pore shape. An equation, derived from a pore size distribution function in generalized form, was used to linearize the compression corrected mercury intrusion data of several samples on a log-log plot. Using log-log plots, volume changes due to sample compaction can be straightforwardly identified and then separated from volume changes due to mercury intrusion into pores. Equations were also derived for calculating surface areas from the slope and intercept parameters of these log-log plots. These surface areas, which are compression corrected and compaction corrected, have agreed well with BET surface areas. These methods of analysis, which was developed for mercury intrusion porosimetry, are also demonstrated for water intrusion porosimetry using an untreated sample of macroporous polystyrene. DOE

N83-34842# Battelle Inst., Frankfurt am Main (West Germany).
THEORETICAL AND EXPERIMENTAL INVESTIGATIONS ON HEATING, COOLING AND THERMOMETRY OF MATERIAL SCIENCE SAMPLES IN THE ELLIPSOIDAL MIRROR FURNACE ELLI
E. G. Lierke and K. Floegel Paris ESA Jan. 1983 77 p refs (Contracts ESTEC-4494/80/NL-HP; ESTEC-5153/82/NL-HP)
(BleV-R-64.615/R-65.381-1; ESA-CR(P)-1753) Avail: NTIS HC A05/MF A01

Heating, melting, solidification and cooling of focussed spherical samples with diameters between 2 and 20 mm and a wide range of material parameters are described. Spherical samples were selected because they enable a clear distinction between thermodynamic radiation, conduction and convection and an easy comparison between theory and experiment. Methods to suppress radiation components distorting a pyrometric sample observation are studied. Absorbing and reflecting notch and edge filters of different materials and geometry are investigated with respect to tolerable blocking losses (efficiency reduction of the furnace) and effective suppression of the distorting radiation components (mainly the hot filament of the tungsten-halogene lamp). The measurements indicate that the wavelength range between 3.6 and 4.7 micrometers is the optimal range for pyrometric observation of samples with temperatures between 700 and 1600 K, capsuled in quartz cartridges. Author (ESA)

N83-34843# Sheffield Univ. (England). Dept. of Control Engineering.
RECENT DEVELOPMENTS IN ELECTRIC ARC FURNACE OPERATION
A. S. Morris Jun. 1983 20 p refs
(RR-226) Avail: NTIS HC A02/MF A01

The provision of water cooled electric arc furnace walls and roofs, the increased use of iron pellets in the raw material charge, the use of solid state devices in electrode drive systems and the application of digital control are discussed. Integration of computer control of the separate aspects of arc furnace operation into an optimal direct digital control strategy for the furnace is considered. Use of dc plasma torches as an alternative to the ac electric arc as an energy source is forecast. Potential advantages of these include reduced energy costs, use of nonconsumable electrodes, and noncontamination of steel by electrodes. An operational 40 tonne dc plasma torch furnace is reported. Author (ESA)

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N83-34844# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
THE B-1 BOMBER PROGRAM: A NEW START
13 Apr. 1983 9 p
(AD-A127523; GAO/MASAD-83-21) Avail: NTIS HC A02/MF A01 CSCL 05/1

We recently completed our review of the B-1B bomber program. This review was made because the B-1B is a key element of the strategic force modernization program, is costly, and has a compressed development and production schedule to meet the initial operational capability date of 1986. Our review was also

directed at examining the B-1B cost estimates, management plans, and cost performance reports. We found that the B-1B program cost estimate still omits known program costs. We are concerned that the cost omissions obscure congressional visibility of the B-1B acquisition. In this regard, we recommend that you have your Office provide the Congress in a single package an estimate, including all the acquisition costs related to the B-1B program. GRA

N83-34845# Office of Naval Research, London (England).
EUROPEAN SCIENTIFIC NOTES, VOLUME 37, NO. 5 Monthly Report
David Mosher and Larry E. Shaffer 31 May 1983 34 p refs
(AD-A130415; ESN-37-5) Avail: NTIS HC A03/MF A01 CSCL 05/2

European Scientific (ESN) is a monthly publication with brief articles on recent developments in European scientific research. The publication is not intended to be part of the scientific literature. The value of ESN articles to Americans is to call attention to current developments in European science and technology and to the institutions and people responsible for these efforts. ESN authors are primarily ONRL staff members. Occasionally articles are prepared by or in cooperation with staff members of the USAF European Office of Aerospace Research and Development or the US Army Research and Standardization Group. Qualified US scientists traveling in Europe may also be invited to author and ESN article. Author (GRA)

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N83-34846*# Engineering and Economics Research, Inc., Vienna, Va.
THE UARS AND OPEN DATA CONCEPT AND ANALYSIS STUDY Final Report
M. Mittal, J. Nebb, and H. Woodward Mar. 1983 125 p refs
(Contract NAS5-26962)
(NASA-CR-173010; NAS 1.26:173010) Avail: NTIS HC A06/MF A01 CSCL 05B

Alternative concepts for a common design for the UARS and OPEN Central Data Handling Facility (CDHF) are offered. Costs for alternative implementations of the UARS designs are presented, showing that the system design does not restrict the implementation to a single manufacturer. Processing demands on the alternative UARS CDHF implementations are then discussed. With this information at hand together with estimates for OPEN processing demands, it is shown that any shortfall in system capability for OPEN support can be remedied by either component upgrades or array processing attachments rather than a system redesign. In addition to a common system design, it is shown that there is significant potential for common software design, especially in the areas of data management software and non-user-unique production software. Archiving the CDHF data are discussed. Following that, cost examples for several modes of communications between the CDHF and Remote User Facilities are presented. Technology application is discussed. Author

N83-34847*# Engineering and Economics Research, Inc., Vienna, Va.
THE UARS AND OPEN DATA SYSTEM CONCEPT AND ANALYSIS STUDY. EXECUTIVE SUMMARY
M. Mittal, J. Nebb, and H. Woodward Mar. 1983 36 p refs
(Contract NAS5-26962)
(NASA-CR-173011; NAS 1.26:173011) Avail: NTIS HC A03/MF A01 CSCL 05B

Alternative concepts for a common design for the UARS and OPEN Central Data Handling Facility (CDHF) are offered. The designs are consistent with requirements shared by UARS and OPEN and the data storage and data processing demands of these missions. Because more detailed information is available for UARS, the design approach was to size the system and to select components for a UARS CDHF, but in a manner that does not optimize the CDHF at the expense of OPEN. Costs for alternative implementations of the UARS designs are presented showing that the system design does not restrict the implementation to a single manufacturer. Processing demands on the alternative UARS CDHF implementations are discussed. With this information at hand together with estimates for OPEN processing demands, it is shown that any shortfall in system capability for OPEN support can be remedied by either component upgrades or array processing attachments rather than a system redesign. Author

N83-34848# Geological Survey, Washington, D. C.
STORAGE AND RETRIEVAL OF GROUND-WATER DATA AT THE US GEOLOGICAL SURVEY
Maria W. Mercer and Charles O. Morgan 1982 12 p refs
(GSC-856; LC-82-600558) Avail: NTIS HC A02/MF A01

The U.S. Geological Survey maintains a computerized Ground Water Site-Inventory (GWSI) file that contains information about wells and springs at sites from all States of the United States. This file contains data collected by U.S. Geological Survey personnel and personnel of cooperating State, local, and Federal agencies. The file is easily accessible to members or users of the National Water Data Exchange (NAWDEX). Since the establishment of the GWSI file in 1974, the data base has grown 19 percent per year and contains information on about 770,000 sites as of February 1981. Author

N83-34849# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Ocean Science and Technology Lab.
HYDROGRAPHIC INFORMATION HANDLING SYSTEM (HIHAN) CONCEPT DEVELOPMENT
J. Byrnes, J. Caruthers, H. Mesick, and J. Vega Mar. 1983 93 p
(AD-A126737) Avail: NTIS HC A05/MF A01 CSCL 09/2

Background information on present NAVOCEANO hydrographic systems is presented. Attributes sought in the HIHAN concept, a proposed logical or functional design concept based on structural analysis, and a scenario is described. Tasks NAVOCEANO undertakes in response to survey requests are outlined. GRA

N83-34850# Defence Research Establishment Suffield, Ralston (Alberta).
METHODS OF LIBRARY SURVIVAL: THE JOURNAL RESOURCE SHARING NETWORK
John G. Currie Feb. 1983 13 p refs
(AD-A126625; PCN-64D00; DRES-359) Avail: NTIS HC A02/MF A01 CSCL 05/2

The current situation of journal subscriptions in a Research and Development Information Center is examined. The problems of high journal cost, literature scatter and staff-actioned maintenance duties are noted. A journal resource sharing network of similar information centers within the Research and Development branch of the Department of National Defense is proposed and its workings are illustrated. Author

N83-34851# Naval Postgraduate School, Monterey, Calif. Dept. of Adminstrative Sciences.
A COMPUTER-BASED INFORMATION SYSTEM FOR THE ISSUE/RECEIPT CONTROL BRANCH, SUPPLY DEPARTMENT, NAVAL POSTGRADUATE SCHOOL M.S. Thesis
Thaddeus F. Zychowski Dec. 1982 104 p refs
(AD-A126435) Avail: NTIS HC A06/MF A01 CSCL 09/2

Several functional areas that provide support to the material acquisition process were examined for possible utilization of a computer-based management information system which would improve the effectiveness of those processes performed within each functional area. The support functions are described as they are presently performed. Internal or external influences on these functions are reviewed, followed by a proposed computer-based

information system, its accompanying data base, and a prototype systems. Author

N83-34852# Army Construction Engineering Research Lab., Champaign, Ill.
LIFE-CYCLE COST DATABASE. VOLUME 1: DESIGN Final Report
R. D. Neathammer Jan. 1983 74 p refs 2 Vol.
(DA Proj. 4A7-62731-AT-41-A-033)
(AD-A126644; CERL-TR-P-139-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 05/2

Life cycle cost (LCC) databases for selected building systems were investigated. These databases would be used by designers to compute LCC costs for design alternatives, installation and District personnel to generate maintenance and repair (M&R) data to justify new construction versus modification of existing facilities, and planners in the Office of the Chief of Engineers to provide summarized M&R cost data for various types of facilities. Databases were designed for heating, ventilating, and air-conditioning systems, roofing surfaces, interior finishes, and exterior finishes. When the data for them have been developed, they will be ready for use in actual projects. The feasibility of using analytical methods to develop information for LCC databases was investigated. The analysis showed that use of Engineering Performance Standards is the best way to obtain the data. Author

N83-34853# Los Alamos Scientific Lab., N. Mex.
DATA COMMUNICATION NETWORK TOPOLOGICAL DESCRIPTION USING DATATRIEVE
L. R. Creel and R. R. Horning 1982 8 p refs Presented at Fall DECUS US Symp., Anaheim, Calif., 6 Dec. 1982
(Contract W-7405-eng-36)
(DE83-003530; LA-UR-82-3390; CONF-821201-4) Avail: NTIS HC A01/MF A01

The design and implementation of a database that maintains circuitry information about several thousand data communication channels are described. The topological database consists of an integrated series of Datatrieve files, Datatrieve procedures, and FORTRAN tasks. Together they describe the physical layout of all synchronous and asynchronous communication channels from the individual offices to the central computing facility at the Los Alamos National Laboratory. The database also records administrative data for each channel. The host computer is a PDP-11/70 running RSX-11M, Version 4.0. All files, procedures, and programs are described. DOE

N83-34854# California Univ., Livermore. Lawrence Livermore Lab.
STANDARDIZED DATA-ACQUISITION SYSTEM PROJECT Final Report
George Bush Jun. 1982 47 p refs
(Contract DE-AC02-76CH-00016)
(DE82-018758; UCRL-53253) Avail: NTIS HC A03/MF A01

The purpose of this project was to select a standard data-acquisition system to measure the performance of the Solar Industrial Process Heat (SIPH) Program field tests. The task of performance monitoring implies a system that can measure insolation, system temperatures, heat flows, and parasitic and backup energy use. Presently used SIPH data-acquisition systems and the proposed system that corrects these problems are described. The methodology selecting a standard data-acquisition system is described, from defining the needs, writing a specification, selecting prototypes for evaluation, testing these prototype units in the laboratory and then in the field, evaluating the results, and making the final selection. Some interesting untested data-acquisition systems are briefly described. DOE

N83-34855# Philips Zentrallaboratorium G.m.b.H., Hamburg (West Germany).
ELECTRONIC PICTURE BASE
Hans-Dieter Boehring, Hubertus Busch, Jens Christiansen, Jacobus Coumans, Ruediger Grewer, Hans-Dieter Hinz, Herbert Loebl, Dietrich Meyer-Ebrecht, Rainer Pape, Ulf Rothgordt et al Mar. 1983 167 p refs Transl. into ENGLISH of 'Elektronische Bildbank" rept. DV-81-005 Federal Ministry for Research and Technology, Bonn, Sep. 1981 192 p Original language document was announced as N82-15798
(PB83-170035; BMFT-FB-DV-81-005) Avail: NTIS HC A08/MF A01 CSCL 05B

The electronic processing and filing of large quantities of pictures was studied. An approach to the architecture of decentralized picture-processing/picture-base systems is described. For the signal level a concept was developed for a fast and flexible picture processor, and methods for the implementation of picture operation, in particular picture coding processes, were elaborated. A state of technology review of peripheral devices was performed. Extensive investigations were carried out concerning electrostatic greytone printing. Promising results were achieved with the electrophoretic process and an experimental system was assembled to study architectural problems as well as to test peripheral devices. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N83-34856# Cranfield Inst. of Tech., Bedfordshire (England). College of Aeronautics.
REPAIR OF BALLISTICALLY IMPACTED CARBON FIBRE REINFORCED (CFR) LAMINATES
J. B. Young and N. Matthews Nov. 1982 21 p refs
(CAR-8303; ISBN-0-902938-84-7) Avail: NTIS HC A02/MF A01

Thin monolithic Carbon Fiber Reinforced Panels impacted with small arms projectiles, it is shown, can be adhesively repaired restoring the damaged panel tensile strength to between 85% and 90% of the original. The compressive buckling strength of the thin CFC panels was found not to be significantly affected by ballistic impacting. The repair is primarily concerned with single-sided repairs utilizing a wet laminating repair patch technique and a precured patch technique. The repair research showed that for the particular impact damage sustained by the CFC panels there existed optimum repair patch physical parameters (i.e., overlap length and ply composition) for strength restorations above 85%. The research highlighted a number of repair techniques which adversely affected strength restorations. These techniques involved the removal of the damage area, use of precured square patches and the use of narrow repair patches. The construction and the testing of the laminates used in the research are detailed, and theoretical repair analysis which complements the actual repaired panel characteristics is presented. Author

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N83-34857# Naval Postgraduate School, Monterey, Calif.
TECHOLOGY TRANSFER AGENTS' PERCEPTIONS OF THE

TECHNOLOGY TRANSFER PROCESS M.S. Thesis
Bernardine Antoinette Lennon Dec. 1982 60 p refs
(AD-A126775) Avail: NTIS HC A04/MF A01 CSCL 05/1

The perceptions of technology transfer agents and individuals who staff the Office of research and technology applications (ORTA) at Federal laboratories and agencies were investigated. Specific areas studied are: (1) a description of the technology transfer office; (2) the form of initial contact between technology transfer agents and users; (3) the technology transfer process employed; (4) technology transfer agent and ORTA demographics; and (5) areas were the technology transfer process effectiveness can be increased. Areas which the technology transfer agents and ORTA's perceive as needing improvement in the technology transfer process both within the laboratory and from the parent agency and also from the Federal government are developed. The perceptions of the ORTA's in the implementation of the Stevenson-Wydler Technology Innovation Act are also discussed. The technology transfer agents' and ORTAs' areas of concern are addressed. GRA

N83-34858# Argonne National Lab., Ill. Energy and Environmental Systems Div.
TOTAL ENERGY-USE ANALYSIS OF URBAN TRANSPORTATION ENERGY-CONSERVATION STRATEGIES
Margaret K. Singh and Sarah J. LaBelle Jan. 1983 25 p refs Presented at the Transportation Research Board Ann. Meeting, Washington, D.C., 17 Jan. 1983
(Contract W-31-109-eng-38)
(DE83-009444; CONF-830131-1) Avail: NTIS HC A02/MF A01

Total energy consumption, by fuel type, resulting from local travel (by urban households) in 1980, 1990, and 2000, in two scenarios and three alternative policies was evaluated. Energy consumed in vehicles operation, fuel production, vehicle production, and infrastructure construction was projected, and the relative impact of each policy was also evaluated. A substantial decline in total energy use in national urban passenger travel from 1980 to 2000 was projected for both scenarios and all three policies. It is also indicated that indirect energy use required to support the policies is offset some of the policies' direct energy savings. The resulting scenario in the greatest total energy savings does not save the greatest amount of petroleum. DOE

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N83-34859 Massachusetts Univ., Amherst.
OBSERVATIONS OF SIO MASERS IN THE CIRCUMSTELLAR ENVELOPES OF LATE TYPE STARS Ph.D. Thesis
Adair Payson Lane 1982 203 p
Avail: Univ. Microfilms Order No. DA8229571

The properties of silicon monoxide masers toward late type stars were investigated by means of time monitoring studies and very long baseline interferometry. Spectral were obtained in the J = 1.0,v = 1,2, and 3(43 Ghz) and J = 2.1, v = 1 (86 Ghz) transitions of SiO toward twelve long period variables and Orion/IRc2 at twenty-two epochs over a 2.5 year period. The integrated SiO line flux for most sources exhibits both periodic variations which correlate with the stellar infrared light cycle and secular variations. Detailed analysis of the correspondence of velocity structure in different transitions indicates a common location for the J = 1.0 masers in different vibrational states but a different origin for the v = 1, J = 2.1 masers. Line intensity ratios of different transitions are examined in order to further constrain maser pump models. Dissert. Abstr.

N83-34860 Texas Univ., Austin.
AN INVESTIGATION INTO THE NATURE OF THE SYMBIOTIC STARS Ph.D. Thesis
Mark Haines Slovak 1982 530 p
Avail: Univ. Microfilms Order No. DA8227723

A sample of twelve symbiotic variables were examined using both low and high resolution ground-based and satellite observations. The majority of the stars were quiescent stellar, or S-type, systems; observations were also obtained for CH Cygni, AX Persei and AG Draconis during or following their respective 1977, 1978 and 1980 eruptions. High resolution photoelectric Zeeman spectra of AG Pegasi and EG Andromedae failed to find confirming evidence for coherent surface magnetic fields; similar data for CH Cyg following the 1977 eruption also indicated such fields are not present at outburst, thus weakening the single star magnetic model. Contemporaneous optical and ultraviolet spectra for AG Peg yielded revised estimates for the orbital parameters. Composite continuum energy distributions were derived for ten stars from 1200 A to 3.4 microns. The role of accretion in the symbiotics remains uncertain. Accretion models posit a main sequence accretor in order to explain the lack of a significant soft X-ray flux. The models for AG Peg and AG Dra, however, indicate the primaries are subluminous evolved stars, similar to the central objects of planetary nebulae. These results suggest accretion in the symbiotics may be sporadic, occurring in 'bursts', and that at quiescence the accretion disks may dissipate. Dissert. Abstr.

N83-34861 Pennsylvania State Univ., University Park.
AN H ALPHA SPECTROSCOPIC SURVEY OF COOL HELIUM-RICH C2 AND DC WHITE DWARFS Ph.D. Thesis
Frank H. Yackovich 1982 170 p
Avail: Univ. Microfilms Order No. DA8300877

An H alpha spectroscopic study of fourteen cool helium-rich C2 and DC white dwarfs was completed at Kitt Peak National Observatory, using the 2.1 m telescope and the Intensified Image Dissector Scanner (IIDS) detector system. The fluxes for seven of these stars were combined with earlier blue spectra taken with the same system, yielding high signal-to-noise over the entire spectral region. A modified version of Kurucz's (1970) ATLAS program including the effects of convection was used to derive meaningful upper limits to the hydrogen abundance in these stars, as well as accurate carbon abundances through detailed fitting the C2 Swan band absorption features. The results show that non-magnetic C2 white dwarfs are hydrogen-poor, and that the upper limit of both the hydrogen and carbon accretion rates are several orders of magnitude below even the simple Eddington accretion rate. This result supports the argument for an internal origin of carbon in C2 white dwarf atmospheres. Experimental determinations of both diffusion velocities and diffusion timescales for carbon in the atmospheres of helium-dominated C2 white dwarfs are given. Dissert. Abstr.

N83-34862*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE MXB1916-053/4U1915-05: BURST PROPERTIES AND CONSTRAINTS ON A 50 MINUTE BINARY SECONDARY
J. H. Swank, R. E. Taam, and N. E. White Aug. 1983 40 p refs Submitted for publication
(NASA-TM-85079; NAS 1.15:85079) Avail: NTIS HC A03/MF A01 CSCL 03A

Results are presented from OSO-8 and HEAO-1 A2 observations of 34 bursts from the X-ray burster MXB1916-053/4U1915-05 recently discovered to show a 50 minute binary period. While 11 burst previously reported all had similar light curves, 22 observed two years later show a factor of 3 range of peak fluxes and decay times between 3 and 20 s. Recurrence times between successive bursts vary between 3 and 6 hours. A ratio of steady flux to average burst flux of equiv 120 is developed. A burst

observed with the HEAO-1 A2 experiment showed an initial temperature rise to a peak black body temperature of equiv 3 keV followed by the cooling typical of type I bursts. The burst was unusual in that the apparent projected size of a blackbody source increased by a factor of 3 during the cooling phase. Author

N83-34863# Royal Greenwich Observatory, Herstmonceux (England).
THIRD GREENWICH CATALOGUE OF STARS, SUN, PLANETS AND MOON FOR 1950.0
R. H. Tucker, M. E. Bountempo, P. Gibbs, and R. H. D. Swifte 1983 49 p refs Document includes a Microfiche supplement (Bull-187; ISSN-0308-5074) Avail: NTIS HC A03/MF A01; HMSO £6.50; PHI

The results of observations made at Greenwich with the Airy Transit Circle from 1942 May 26 to 1954 March 30 are presented. The results for the Sun, planets and Moon are re-reductions of results previously published. The observed right ascensions and declination of 378 fundamental stars are given (76 azimuth stars and 235 clock stars listed with their adopted right ascension corrections (Gr - FK3) respectively, and 67 FK4 stars selected to represent the fundamental system in the zenithal zone). A selection of 255 stars in the declination zone +50 deg 30 min to + 51 deg 10 min, intended for use by the photographic zenith tube at Herstmonceux, is shown. The 76 circumpolar stars which were observed in both culminations are included, with results of observations above and below pole separately. Author (ESA)

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N83-34864 Minnesota Univ., Minneapolis.
STABILITY OF ASTROPHYSICAL BEAMS Ph.D. Thesis
Ralph Lierheimer Fiedler 1982 105 p
Avail: Univ. Microfilms Order No. DA8301925

The stability of a plasma beam traveling through a confining external medium is studied in an astrophysical context. Empirical relations were obtained relating the growth rates of small boundary perturbations to the beam Mach number, the ratio of internal to external sound speed and the perturbation wavenumber. Pinching mode instabilities are found to be the least stable mode for subsonic flow, whereas helical mode instabilities are the least stable for supersonic flow. An axial magnetic field acts to significantly destabilize a beam, over the hydrodynamic case, only if the beam is supersonic and the magnetic field pressure is on the same order, or greater than, the plasma gas pressure. The least stable wave modes, as evaluated by the empirical relations, were used to estimate an upper limit to the distance a beam can travel before non-linear effects become important. Comparing observations of extended extragalactic radio sources with the distance limit provides information on the Mach number and sound speed ratio. Dissert. Abstr.

N83-34865 Princeton Univ., N. J.
DISSIPATIONLESS COLLAPSE OF DENSE STELLAR SYSTEMS Ph.D. Thesis
Thomas Aquinas McGlynn 1982 135 p
Avail: Univ. Microfilms Order No. DA8301417

A numerical technique is applied to the dissipationless collapse of point masses. The numerical scheme involves an expansion of the potential in a radial grid, using spherical harmonics to express the angular dependence. Advantages are an ability to model extremely high density cores in systems, a strong damping of two body interactions, and an efficient algorithm for integrating the equations of motion. A very wide range of initial conditions is considered, with particular emphasis on the initial temperature and clumpiness of the systems. Some simulations consider extremely anisotropic initial conditions and the effects of large angular momenta. The final states of the system are strongly dependent on the initial temperature, but information on the initial inhomogeneity appears to be lost. Large density contrasts are obtainable in systems starting with low temperatures. These systems also appear to give reasonable fits to Hubble or de Vaucouleurs profiles over virtually their entire mass. The distribution function of the final states is computed as a function of energy, and alternatively as a function of energy and angular momentum. Dissert. Abstr.

N83-34866 State Univ. of New York, Stony Brook.
THE DISTRIBUTION OF MOLECULAR CLOUDS IN THE GALAXY: H2 AS A MAJOR COMPONENT OF THE INTERSTELLAR MEDIUM Ph.D. Thesis
David Bruce Sanders 1982 259 p
Avail: Univ. Microfilms Order No. DA8301448

An extensive survey of molecular clouds in the galaxy is presented. Observations of CO J = 1.0 emission are interpreted to determine the galactic distribution of molecules and the total number, size and mass of molecular clouds. Two major data sets were obtained: (1) a 1060 point grid in C-12O covering / 356 to 70 deg in steps of one degree and /b/ < or approximately 1.6 deg in steps of 0.2 deg and, (2) a 1006 point strip map in C12O at or near b = 0 deg, from / = 10 deg to 51 deg sampled at intervals of 0.033 deg or 0.067 deg. The radial distribution of CO emission at R < R annually indicates an intense concentration of molecular gas in the galactic center (R < 1 kpc), where the total integrated intensity is equal to 50 K kms, a minimum between 1.5 and 3.5 kpc, a peak at 6 kpc, then a decrease toward larger radius with an exponential scale length of 2.7 kpc. The shape of the H2 distribution is in sharp contrast to the flat H1.
Dissert. Abstr.

N83-34867 California Univ., Berkeley.
SIMULATIONS OF MERGING GALAXIES Ph.D. Thesis
John Negroponte 1982 166 p
Avail: Univ. Microfilms Order No. DA8300601

A large number of numerical simulations of merging disk - halo galaxies was performed for a wide variety of initial conditions and parameter choices. The disks of these galaxies contain a 'gaseous' component which, using a newly developed algorithm, is modelled as a collection of variable radius spheres capable of undergoing inelastic collisions. Galaxies on initially bound or marginally unbound orbits interact strongly and eventually merge; the details of this interaction and the properties of merger remnants are studied extensively. The remnants are ellipsoidal and have a wide range of principal axis flattenings which depend on the pericentric distance of the initial orbit and on the orientation of the initial disk spins; they show R(-2) projected 'luminosity' profiles and flat rotation curves, in agreement with observations of elliptical galaxies. If elliptical galaxies are remnants of such mergers, the low observed rotation velocities then suggest a preponderance of low angular momentum mergers; if this is the case, the results favor the hypothesis that elliptical galaxies are intrinsically prolate or triaxial. Dissert. Abstr.

N83-34868*# Fermi National Accelerator Lab., Batavia, Ill.
NUCLEAR CONSTRAINTS ON THE AGE OF THE UNIVERSE
David N. Schramm (Chicago Univ.) Dec. 1982 19 p refs Presented at the 18th General Assembly of the Intern. Astron. Union, Patras, Greece, 17-26 Aug. 1982
(Grant NsG-7212; Contract DE-AC02-76CH-03000; Grants NSF AST-78-20402; DE-AC02-80ER-10773)
(NASA-CR-172848; NAS 1.26:172848; DE83-004461; FERMILAB-CONF-82/93; CONF-820107-1) Avail: NTIS HC A02/MF A01 CSCL 03B

A review is made of how one can use nuclear physics to put rather stringent limits on the age of the universe and thus the cosmic distance scale. The age can be estimated to a fair degree of accuracy. No single measurement of the time since the Big Bang gives a specific, unambiguous age. There are several methods that together fix the age with surprising precision. In particular, there are three totally independent techniques for estimating an age and a fourth technique which involves finding consistency of the other three in the framework of the standard

Big Bang cosmological model. The three independent methods are: cosmological dynamics, the age of the oldest stars, and radioactive dating. This paper concentrates on the third of the three methods, and the consistency technique. DOE

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N83-34869 Massachusetts Univ., Amherst.
THE SWARM MODEL FOR THE AZIMUTHAL BRIGHTNESS VARIATIONS IN SATURN'S RING A Ph.D. Thesis
William Thomas Thompson 1982 206 p
Avail: Univ. Microfilms Order No. DA8229618

A number of researchers have observed asymmetric azimuthal variations in Saturn's ring A not seen in any other portion of the rings. In order to explore this effect, photometric observations of the ring system at for ring tilts, four colors and a range of phase angles, are presented and analyzed. These images are calibrated, converted in ring plane coordinates, and corrected for smearing. The azimuthal effect appears to reach a maximum 40% peak-to-peak variation at a tilt angle near B = s11.5 deg, with a minimum rightness occurring at an orbital phase angle of theta sub 0 = 66 deg + or 2 deg. Phase curves for the rings, and major axis ring profiles are also presented. The azimuthal variations are modelled by ellipsoidal swarms caused gravitational interactions between ring particles. Monte Carlo routines are developed to handle the light scattering properties of triaxial ellipsoids, both for surface (e.g., asteroidal) scattering, and interior scattering. The contribution of backscattered light from the swarms, and from an interswarm medium are separated, and model ellipsoids are compared to the data. Dissert. Abstr.

N83-34870*# Atmospheric and Environmental Research, Inc., Cambridge, Mass.
NEW MARTIAN SATELLITE SEARCH Final Report, 1 Jun. 1980 - 31 May 1983
May 1983 58 p refs
(Contract NASw-3399)
(NASA-CR-173030; NAS 1.26:173030) Avail: NTIS HC A04/MF A01 CSCL 03B

The approach pictures taken by the Viking 1 and Viking 2 spacecrafts two days before their Mars orbital insertion maneuvers were analyzed in order to search for new satellites within the orbit of Phobos. To accomplish this task, search procedure and analysis strategy were formulated, developed and executed using the substantial image processing capabilities of the Image Processing Laboratory at the Jet Propulsion Laboratory. The development of these new search capabilities should prove to be valuable to NASA in processing of image data obtained from other spacecraft missions. The result of applying the search procedures to the Viking approach pictures was as follows: no new satellites of comparable size (approx. 20 km) and brightness to Phobos or Demios were detected within the orbit of Phobos. Author

N83-34871*# California Univ., Berkeley. Space Sciences Lab.
MILLIMETER WAVELENGTH OBSERVATIONS OF THE PLANETS Final Report
J. Welch Jun. 1983 11 p refs
(Grant NsG-7152)
(NASA-CR-173042; NAS 1.26:173042) Avail: NTIS HC A02/MF A01 CSCL 03B

The planets and their satellites were observed at high resolution at millimeter wavelengths with the Hat Creek Interferometer. Instrumentation and observations are discussed. Author

N83-34872*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SURVEY OF LOW ENERGY PLASMA ELECTRONS IN SATURN'S MAGNETOSPHERE: VOYAGERS 1 AND 2
Edward C. Sittler, Jr., Keith W. Ogilvie, and Jack D. Scudder Sep. 1983 79 p refs Submitted for publication
(NASA-TM-85086; NAS 1.15:85086) Avail: NTIS HC A05/MF A01 CSCL 03B

The low energy plasma electron environment within Saturn's magnetosphere was surveyed by the Plasma Science Experiment (PLS) during the Voyager encounters with Saturn. Over the full energy range of the PLS instrument (10 eV to 6 keV) the electron distribution functions are clearly non-Maxwellian in character; they are composed of a cold (thermal) component with Maxwellian shape and a hot (suprathermal) non-Maxwellian component. A large scale positive radial gradient in electron temperature is observed, increasing from less than 1 eV in the inner magnetosphere to as high as 800 eV in the outer magnetosphere. Three fundamentally different plasma regimes were identified from the measurements: (1) the hot outer magnetosphere, (2) the extended plasma sheet, and (3) the inner plasma torus. Author

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N83-34873 Commonwealth Scientific and Industrial Research Organization, Mordialoc (Australia). Div. of Atmospheric Physics.
THE AUSTRALIAN UV-B MONITORING NETWORK
I. J. Barton 1983 14 p refs
(CSIRO-TP-46; ISBN-0-643-03518-4) Copyright. Avail: Issuing Activity

A network of detectors measuring biologically effective solar ultraviolet radiation (UV-B) around Australia was operated between 1975 and 1981. The network, the detectors used the calibration of the data obtained are discussed. The raw and calibrated data for all instruments, including one at Aspendale that is part of the Temple University (USA) global network, are available on magnetic tape. An appendix gives details of the format in which the data appear on the tape. The network was discontinued at the end of 1981. The UV detectors have given sufficient data to enable the geographic and seasonal climatology of UV-B over Australia to be determined. Any long term changes in the ozone layer will be more accurately detected by the Dobson spectrophotometer, an instrument that is specifically designed to measure total ozone content by sensing the solar radiation at two or more discrete UV wavelengths. Author

N83-34874*# Stanford Univ., Calif. Inst. for Plasma Research.
THE INTERPRETATION OF HARD X-RAY POLARIZATION MEASUREMENTS IN SOLAR FLARES
J. Leach, A. G. Emslie (Alabama Univ., Huntsville), and V. Petrosian Aug. 1983 13 p refs
(Grants NsG-7092; NAGw-294; NSF ATM-82-18125; NSF ATM-83-03172)
(NASA-CR-173060; NAS 1.26:173060; SU-SUIPR-959) Avail: NTIS HC A02/MF A01 CSCL 03B

The significance of low hard X-ray polarization measurements for non-thermal models is discussed. Such a low polarization result, it is shown, can in fact occur in non-thermal models, and the ways in which the degree of X-ray polarization is correlated with the parameters of these models is discussed. Author

N83-34875*# Massachusetts Inst. of Tech., Cambridge.
CORONAL SOURCES OF THE INTRASTREAM STRUCTURE OF THE SOLAR WIND Final Report
James D. Sullivan and Herbert S. Bridge Aug. 1983 53 p refs
(Contract NAS8-33137)
(NASA-CR-170855; NAS 1.26:170855) Avail: NTIS HC A04/MF A01 CSCL 03B

Short time scale changes in the bulk speed were found not to coincide with X-ray transients near the sub-earth point nor with the number of X-ray bright points within a coronal hole and near the equator. The changes in bulk speed, it is shown, are associated with changes in light areas in a hole which may be associated with the opening or closing of magnetic field lines within the coronal hole. That there is a causal connection between these sudden changes (apperance or disappearance) in light area and sudden changes in the bulk speed of the solar wind is further evidenced by the spatial proximity on the Sun of these changing light regions to the source position of stream lines from Levine's model that connect into the same solar wind streams. Author

N83-34876*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GREAT MICROWAVE BURSTS AND HARD X-RAYS FROM SOLAR FLARES
Herbert J. Wiehl, David A. Batchelor, Carol Jo Crannell, Brian R. Dennis, and Phillip N. Price Jun. 1983 112 p refs
(NASA-TM-85052; NAS 1.15:85052) Avail: NTIS HC A06/MF A01 CSCL 03B

The microwave and hard X-ray charateristics of 13 solar flares that produced microwave fluxes greater than 500 Solar Flux Units were analyzed. These Great Microwave Bursts were observed in the frequency range from 3 to 35 GHz at Berne, and simultaneous hard X-ray observations were made in the energy range from 30 to 500 keV with the Hard X-Ray Burst Spectrometer on the Solar Maximum Mission spacecraft. The principal aim of this analysis is to determine whether or not the same distribution of energetic electrons can explain both emissions. Correlations were found between respective temporal characteristics and, for the first time, between microwave and hard X-ray spectral characteristics. A single-temperature and a multi-temperature model from the literature were tested for consistency with the coincident X-ray and microwave spectra at microwave burst maximum. Four events are inconsistent with both of the models tested, and neither of the models attempts to explain the high-frequency part of the microwave spectrum. A model in which the emissions above and below the peak frequency originate in two different parts of a diverging magnetic loop is proposed. With this model the entire microwave spectrum of all but one of the events is explained. Author

N83-34877# Naval Research Lab., Washington, D. C. Center for Space Research.
THE SOLAR SPECTRUM 3069-2095 ANGSTROMS FROM THE ECHELLE SPECTROGRAPH FLOWN IN 1961 AND 1964. AN EXTENSION OF ROWLANDS PRELIMINARY TABLE OF SOLAR SPECTRUM WAVELENGTHS Interim Report
Charlotte E. Moore, Richard Tousey, and Charles M. Brown 30 Dec. 1982 174 p refs
(RR0330243)
(AD-A126575; NRL-8653) Avail: NTIS HC A08/MF A01 CSCL 03/2

The final listing of solar lines recorded in the NRL echelle spectra photographed at high resolution from Aerobee rockets flown in 1961 and 1964 is presented. The wavelength range covered is 3059A to 2095A. It is intended to accompany NRL report no. 7788, An Atlas of the Solar Spectrum Between 2226 and 2922 Argstroms, which presents the solar irradiance at 0.03 A resolution as derived from the echelle spectra. Solar wavelengths are given to 0.01 A, and estimated solar intensities are listed on a visual scale of 1 to 9. Laboratory wavelengths, multiplet numbers, and references are cited for each line. Approximately 6150 lines are reported, of which 80% are identified. GRA

N83-34878# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo. Solar-Terrestrial Physics Div.
SOLAR-GEOPHYSICAL DATA NUMBER 461, JANUARY 1983. PART 1: PROMPT REPORTS. DATA FOR DECEMBER 1982, NOVEMBER 1982 AND LATE DATA
Helen E. Coffey, ed. Jan. 1983 140 p 2 Vol.
(PB83-184275; SGD-461-Pt-1) Avail: NTIS HC A07/MF A01 CSCL 03B

Alert periods; daily solar indices; solar flares; solar radio emission; inferred interplanetary magnetic field polarities; mean solar magnetic field; daily solar activity centers; sudden ionospheric disturbances; cosmic rays; geomagnetic indices; and radio propagation indices are reported. Author (GRA)

93 SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

N83-34879 Massachusetts Univ., Amherst.
MULTI-FREQUENCY RADIO OBSERVATIONS OF COMPACT EXTRAGALACTIC SOURCES: TIME VARIABILITY AND CORRELATION WITH OPTICAL VARIATIONS Ph.D. Thesis
Thomas Joseph Balonek 1982 400 p
Avail: Univ. Microfilms Order No. DA8229526

In order to investigate the evolution of compact extragalactic radio sources, three observing programs were undertaken. These programs were: single epoch spectra for 113 sources compiled from near simultaneous observations at seven frequencies (between 1.4 and 90 GHz); monthly observations were conducted at lambda 3 mm to search for short timescale variations; and radio (15.5 GHz) and optical variations in 45 sources were searched for correlated activity. The observed radio spectra are the first compilation of near simultaneous observations of this sample of regularly monitored variable sources. These sources exhibit a wide range of variability and spectral characteristics, thus constituting a useful sampler for comparison with theoretical models for radio emission mechanisms. The high frequency radio observations of varible extragalactic radio sources are important for studying the evolution of flux density outbursts, which are affected at lower frequencies by opacity effects and expansion processes. Dissert. Abstr.

N83-34880# Junta de Energia Nuclear, Madrid (Spain). Div. de Medio Ambiente.
DELIN AND DELOG CODES FOR GRAPHIC REPRESENTATION OF GAMMA RAY SPECTRA
L. Romero and A. Travesi 1983 54 p refs In SPANISH; ENGLISH summary
(JEN-544; ISSN-0081-3397) Avail: NTIS HC A04/MF A01

Two FORTRAN 4 Codes were developed for graphic representation of the gamma-ray spectra obtained with GeLi detectors and multichannel analyzers. The graphic plotting is carried out with the graphic plotter Mod HP-7221 A, using the graphic package software GRAPHICS-1000. The codes have a great versatility and the representation of gamma spectra can be done in a lineal, semilog, or log-log scale, as desired. The gamma ray spectra data are fed into the computer through magnetic tape or perforated paper tape. The different output options and complementary data are given in a conversational way through a terminal with T.V. display. Among the options that can be selected by the user are the following: smoothing the spectra, drawing the spectra point by point or continuously, and output drawing in 1, 2, or 1 sheets with automatic division of the energy scale. S.L.

N83-34881# Los Alamos Scientific Lab., N. Mex.
NON-LTE ASTROPHYSICS AND THE ORIGIN OF HIGH-ENERGY COSMIC RAYS
Stirling A. Colgate 1982 8 p refs Presented at the Workshop on Sci. Underground, Los Alamos, N. Mex., 27 Sep. - 1 Oct. 1982 (Contract W-7405-eng-36)
(DE83-004737; LA-UR-82-3578; CONF-820989-2) Avail: NTIS HC A02/MF A01

The most startling aspects of the universe are the departures

from the nonuniform, nonthermodynamic equilibrium state. Mass concentrations and high energy electromagnetic quanta and particles are the primary examples. Of these various departures the extremum of nonexplained phenomena is still the acceleration of cosmic rays. The usual explanation involving multiple mechanisms contributing to various regions of the spectrum is suggested as most unlikely. In particular, the suggestion of the acceleratcn of the very highest energy cosmic rays in distant active galactic nuclei is shown to be untenable because of photon particle interactions. DOE

99 GENERAL

N83-34882* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
OUR FIRST QUARTER CENTURY OF ACHIEVEMENT: JUST THE BEGINNING
Oct. 1983 198 p
(NASA-News-Release-83-132; P83-10167) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 22A

Space flight, space science, space applications, aeronautics, tracking and data acquisition, international programs, technology utilization, NASA installations, the NASA launch record, astronauts, and the fine arts program are reviewed in light of NASA's 25th anniversary. N.W.

N83-34883# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
AGARD HANDBOOK
Jun. 1981 48 p
Avail: NTIS HC A03/MF A01

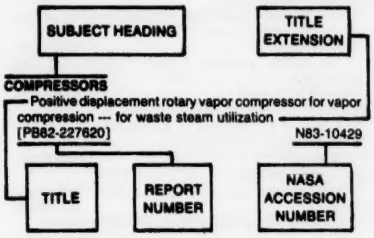
The activities of the Advisory Group for Aerospace Research and Development are summarized. Author

N83-34884# Office of Naval Research, London (England).
EUROPEAN SCIENTIFIC NOTES, VOLUME 37, NO. 3
Vivian T. Stannett, ed. and Larry E. Shaffer, ed. 31 Mar. 1983 39 p
(AD-A128179; ESN-37-3) Avail: NTIS HC A03/MF A01 CSCL 05/2

A German wind shear display, a French colloqium on specialized polymers, robotics research at LAMM, an international conference on higher performance electronic devices, research in navigation techniques, metallurgy and materials, computational complexity research, and novel plasma annuli for implosion experiments are discussed. Author

SUBJECT INDEX

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7051).

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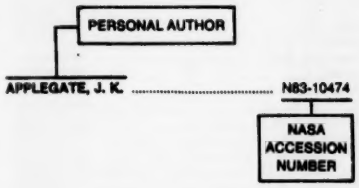

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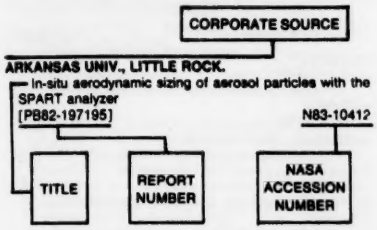

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DEFENSE INTELLIGENCE AGENCY, WASHINGTON, D.C.
Bibliography of Soviet laser developments, No. 57, January - February 1982
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Hydrogen bonding in asphaltenes and coal liquids
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ECOLE NATIONALE SUPERIEURE DES TELECOMMUNICATIONS, PARIS (FRANCE).
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[HM-71-04672] N83-34527

Monitoring and real-time operation software for Modcomp Classic
[HM-16-977] N83-34647

ELECTRICITY COUNCIL, LONDON (ENGLAND).
Effects of cold-rolling on the formation of GP zones and the Theta phase in the AlCu 4% alloy
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ELECTRONICS RESEARCH LAB., ADELAIDE (AUSTRALIA).
On the use of null-steering arrays to enhance the quality of HF skywave communications
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ELTRON RESEARCH, INC., NAPERVILLE, ILL.
Characterization of illuminated semiconductor/solid-electrolyte junctions: Photoelectrochemical investigation of a poly(ethylene oxide) cell
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EMORY UNIV., ATLANTA, GA.
Far infrared studies of superconducting V/sub 3/Si, Nb/sub 3/Ge, and Nb
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ENERGY INFORMATION ADMINISTRATION, WASHINGTON, D.C.
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ENGINEERING AND ECONOMICS RESEARCH, INC., VIENNA, VA.
The UARS and open data concept and analysis study
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[NASA-CR-173011] N83-34847

ENGINEERING-SCIENCE, INC., ATLANTA, GA.
Process modifications and waste-management practices affecting disposal, utilization, and recovery of coal-combustion wastes
[DE83-001840] N83-34471

ENVIRONMENTAL PROTECTION AGENCY, WASHINGTON, D.C.
EPA chemical activities, third edition. Volume 1: Indexes
[PB83-181917] N83-33948

EPA chemical activities, third edition, volume 2
[PB83-181925] N83-33949

ENVIRONMENTAL RESEARCH AND TECHNOLOGY, INC., CONCORD, MASS.
Impact of satellite data on large-scale circulation statistics as determined from GLAS analyses during FGGE-SOP-1
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ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
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Development, implementation and evaluation of satellite-aided agricultural monitoring systems
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ERNO RAUMFAHRTTECHNIK G.M.B.H., BREMEN (WEST GERMANY).
MODSCIT: Modular Design of Spacecraft related to Cost of Integration and Tests. Volume 1: Executive summary
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MODSCIT: Modular Design of Spacecraft related to Cost of Integration and Tests. Volume 2: Technical volume
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Comparison of high-p sub t particle production in pp and p anti p interactions at the CERN ISR
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Effects of acid precipitation on aquatic resources: Results of modeling workshops. Air pollution and acid rain report
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FLORIDA STATE UNIV., TALLAHASSEE.
Compiling an advanced high-order language for a microprocessor. Volume 1: Technical discussion
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Applications of a unified theory of monotonicity in selection problems
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Preliminary engineering study quick opening valve MSFC high Reynolds number wind tunnel (study report appendices)
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Water resources data for New Hampshire and Vermont, water year 1981
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GEOLOGICAL SURVEY, CHEYENNE, WYO.
Water Resources data for Wyoming, water year 1981. Volume 1: Missouri River Basin
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GEOLOGICAL SURVEY, DENVER, COLO.
Two-dimensional, steady-state model of ground-water flow, Nevada Test Site and vicinity, Nevada-California
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Water resources data for Montana, water year 1981. Volume 1: Hudson Bay Basin, Missouri River Basin
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GEOLOGICAL SURVEY, HONOLULU, HAWAII.
Water resources data for Hawaii - other Pacific areas water year 1981. Volume 1: Guam, Northern Mariana Island, Federated States of Micronesia, Palau Islands and American Samoa
[PB83-171116] N83-34446

GEOLOGICAL SURVEY, JACKSON, MISS.
Water resources data for Mississippi, water year 1981
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Review of reported tarsand occurrences and recent projects in Wyoming
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GEOLOGICAL SURVEY, ORLANDO, FLA.
Water resources data for Florida, water year 1981. Volume 1: Northeast Florida
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GEOLOGICAL SURVEY, WASHINGTON, D. C.
US Geological Survey program of offshore resource and geoenvironmental studies, Atlantic-Gulf of Mexico region, from September 1, 1976 to December 31, 1978
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GEORGIA POWER CO., ATLANTA.
Optimization of the design of metallic shield-concentric conductors of extruded dielectric cables under fault conditions
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Recommendations concerning satellite-acquired earth resource data: 1982 report of the Data Management Subcommittee of the GEOSAT Committee, Incorporated
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Magnetic results 1981: Eskdalemuir, Hartland and Lerwick observatories
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Memoirs of the Faculty of Engineering, Kyushu University, vol. 43, no. 1
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NATIONAL AUDOBON SOCIETY, NEW YORK, N.Y.

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NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

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NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA (ONTARIO).

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OAK RIDGE Y-12 PLANT, TENN.
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European Scientific Notes, volume 37, no. 5
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ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH (ENGLAND).
The compressive strength of carbon fiber reinforced plastics
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Third Greenwich catalogue of stars, Sun, planets and Moon for 1950.0
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Techniques for automatic speech recognition N83-34183
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SCIENCE APPLICATIONS, INC., LA JOLLA, CALIF.
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SCIENCE APPLICATIONS, INC., MCLEAN, VA.
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SCIENCE APPLICATIONS, INC., SAN LEANDRO, CALIF.
STEALTH: A language-explicit finite-difference code for solids, structural and thermohydraulic analysis: Volume 2: Sample and verification problems
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SCIENCE RESEARCH COUNCIL, CHILTON (ENGLAND).
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SCIENTIFIC MEASUREMENT SYSTEMS, INC., AUSTIN, TEX.
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SCIENTIFIC SERVICE, INC., HUNTSVILLE, ALA.
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SHARE, INC., CHICAGO, ILL.
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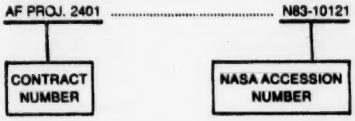

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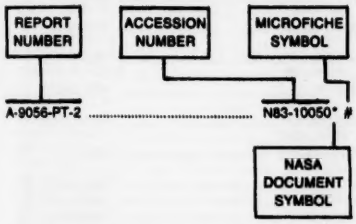

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